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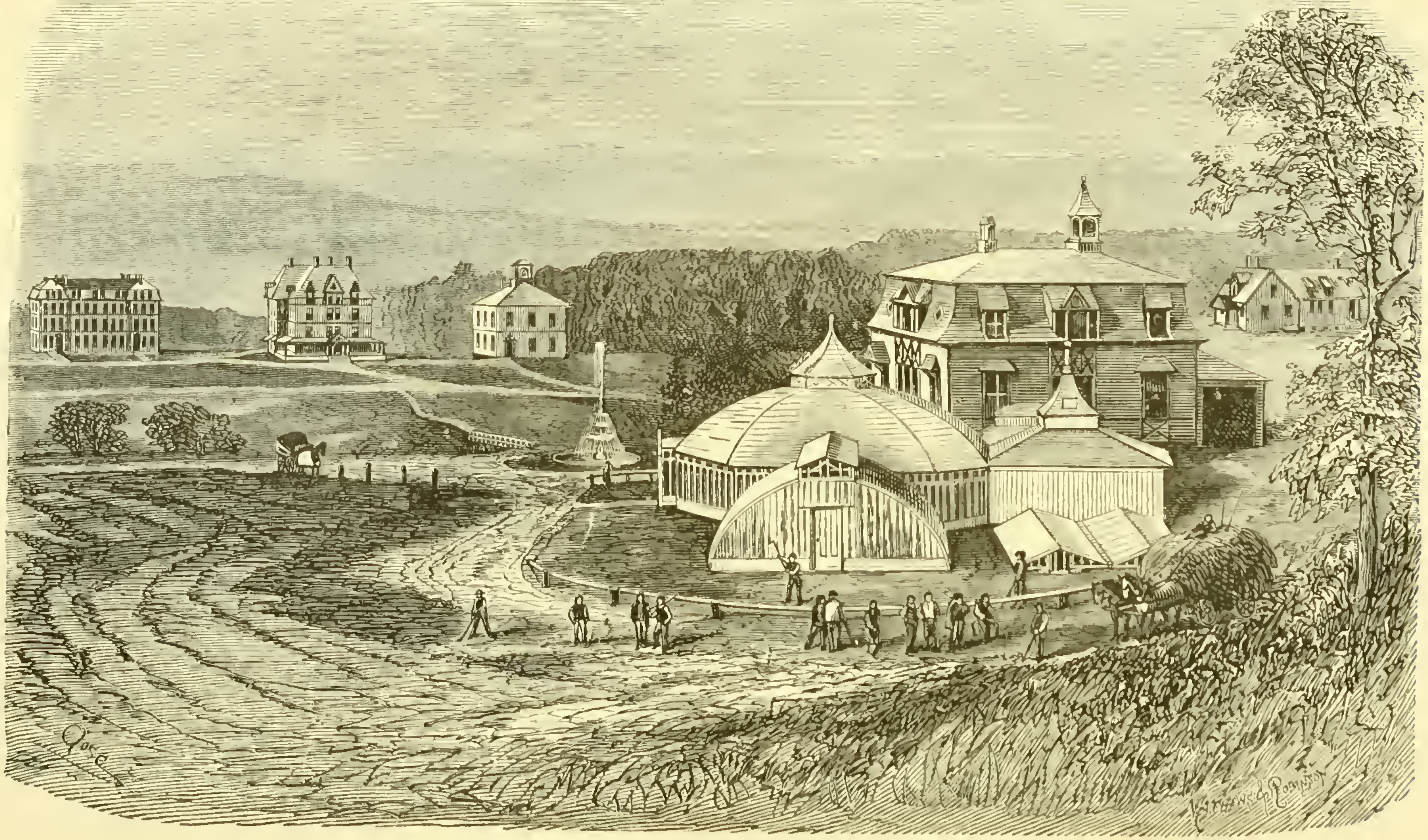

MASSACHUSETTS AGRICULTURAL COLLEGE.

SIXTEENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

Massachusetts Board of Agriculture,

WITH AN APPENDIX

CONTAINING

REPORTS OF DELEGATES APPOINTED TO VISIT
THE COUNTY EXHIBITIONS,

AND ALSO

RETURNS OF THE FINANCES OF THE AGRICULTURAL SOCIETIES

FOR

1868.

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1869.

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STATE BOARD OF AGRICULTURE.

1869.

MEMBERS EX OFFICIIS.

His Excellency WILLIAM CLAFLIN.
His Honor JOSEPH TUCKER.
Hon. OLIVER WARNER, *Secretary of the Commonwealth.*
WILLIAM S. CLARK, *Pres. Mass. Agricultural College.*

APPOINTED BY THE GOVERNOR AND COUNCIL.

	Term Expires.
LOUIS AGASSIZ, *of Cambridge*,	1870
MARSHALL P. WILDER, *of Dorchester*,	1871
JAMES F. C. HYDE, *of Newton*,	1872

CHOSEN BY THE COUNTY SOCIETIES.

Massachusetts,	LEVERETT SALTONSTALL, of Newton,	1871
Essex,	GEORGE B. LORING, of Salem,	1872
Middlesex,	JOHN B. MOORE, of Concord,	1870
Middlesex North,	ASA CLEMENT, of Dracut,	1871
Middlesex South,	JOHN JOHNSON, Jr., of Framingham,	1872
Worcester,	THOMAS W. WARD, of Shrewsbury,	1872
Worcester West,	JOHN T. ELLSWORTH, of Barre,	1872
Worcester North,	LEWIS H. BRADFORD, of Fitchburg,	1872
Worcester North-West,	CHARLES C. BASSETT, of Athol,	1871
Worcester South,	NEWTON S. HUBBARD, of Brimfield,	1871
Worcester South-East,	WILLIAM KNOWLTON, of Upton,	1870
Hampshire, Franklin and Hampden,	H. S. PORTER, of Hatfield,	1870
Hampshire,	JOHN A. MORTON, of Hadley,	1871
Highland,	GEORGE T. PLUNKETT, of Hinsdale,	1872
Hampden,	WILLIAM BIRNIE, of Springfield,	1870
Hampden East,	JAMES S. BLAIR, of Brimfield,	1870
Union,	E. W. BOISE, of Blandford,	1871
Franklin,	IMLA K. BROWN, of Bernardston,	1871
Berkshire,	ALEXANDER HYDE, of Lee,	1870
Hoosac Valley,	JOHN L. COLE, of Williamstown,	1870
Housatonic,	T. D. THATCHER, of Lee,	1870
Norfolk,	ELIPHALET STONE, of Dedham,	1871
Hingham,	ALBERT FEARING, of Hingham,	1870
Bristol,	AVERY P. SLADE, of Somerset,	1872
Bristol Central,	NATHAN DURFEE, of Fall River,	1870
Plymouth,	CHARLES G. DAVIS, of Plymouth,	1872
Marshfield,	GEORGE M. BAKER, of Marshfield,	1870
Barnstable,	GEORGE A. KING, of Barnstable,	1871
Nantucket,	JAMES THOMPSON, of Nantucket,	1872
Martha's Vineyard,	JOHN PIERCE, of Edgartown,	1871

CHARLES L. FLINT, *Secretary.*

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SIXTEENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

BOARD OF AGRICULTURE.

To the Senate and House of Representatives of the Commonwealth of Massachusetts.

The past season has been one of peculiar characteristics. A long and severe winter, during which the ground was generally well covered with snow, and the temperature more than usually uniform, was followed by a wet and somewhat backward spring, a hot, dry and short summer, and an autumn of constant moisture, with early frost. The rainfall of September exceeded thirteen inches, and the snow and freezing cold came so early in November as to endanger the late harvested root and fruit crops.

With these general and well marked meteorological features, the season has been one of more than ordinary prosperity to the farming interests of the Commonwealth. Many of the crops of the farm, the orchard and the garden, like Indian corn, hay and fruit, were abundant and fine in quality; and though farm labor throughout the fall was greatly interrupted by the constant rains, the results of farming operations must, on the whole, be regarded with general satisfaction. The aggregate farm products of the State for the year exceed forty millions of dollars.

The stock of the farm has been healthy, with the exception of a temporary visitation of the Texas cattle fever, which was brought into our markets by the arrival of cattle from the West. It was of short duration, owing to the strenuous and prompt efforts of the executive to check its progress by the appointment of a commission charged with the duty of controlling it. The steps taken by that commission will be more clearly set forth in the following

REPORT OF THE CATTLE COMMISSIONERS.

To the Honorable Senate and House of Representatives of the Commonwealth of Massachusetts.

In accordance with the provisions of law, the undersigned Commissioners on Contagious Diseases among Cattle would submit the following Report:—

No contagious disease has scourged the cattle of the Commonwealth during the year past. The pleuro-pneumonia, so judiciously stamped out three years since, has not again made its appearance in our herds, though it is said to prevail to some extent in the Middle States. The cattle-growing States of the West have the past year been visited by a comparatively new and very alarming disease in their herds, known as Spanish fever, or Texas cattle fever, in consequence of its having been introduced by cattle from Texas, and which has proved alarmingly destructive to the neat stock of some sections. By the transportation of beef cattle, this plague has spread through nearly all the States to the seaboard, creating panic and fear in its progress. The State of New York, along its great lines of travel, and near its principal large cattle markets, became infested with it to such an extent, that State and municipal authority was resorted to, to protect their home stock and prevent the sale of unwholesome beef in their markets. About the 10th of August last, a cattle train was despatched from the cattle-yards of Albany with many diseased cattle on board for sale in the markets of our State. A portion of these diseased cattle were sold in Worcester, and went to Providence. The remainder went on to Brighton. A part, on arriving at Brighton, were sold to Mr. William H. Alger, and by him conveyed to Taunton. The remainder, it is reported, though very much diseased, were immediately slaughtered in the night, and their meat sold in the markets of Boston the following day. These facts being reported to the Commissioners, it was deemed advisable to resort at once to the most stringent measures the law would allow, to prevent the introduction of such diseased cattle into the State, and thus to protect our home stock from the supposed contagion, and our markets from the sale of unwholesome beef. Accordingly, on the 14th of August, instructions were issued to the town authorities of West Stockbridge, Williamstown, Northfield and Winchendon, the points where the railroads that would be likely to transport such cattle enter the State, directing them to use all legal means to prevent the passage of all diseased cattle over the State line, to examine all cattle trains, and to remove all diseased cattle, and put them into quarantine. Letters were also sent to the selectmen of Brighton and Cambridge, warning them of the danger, and asking their co-operation, to protect their cattle-yards and markets from the impending plague. The selectmen of the different towns acted promptly in the matter, and in unison with the managers of the different railroads. The selectmen of Brighton, especially, exercised their powers and discharged their duty with most commendable promptness and efficiency. On the 18th of August, they published a series of regulations, which proved effectual in keeping the disease from their neighborhood. As Albany was the principal source from which their market was supplied with stock, it was the chief point of danger. Two agents were therefore appointed, "to proceed forthwith to Albany, and there examine, and make all possible inquiry in regard to all the cattle about to be shipped to Brighton." Those agents proceeded to Albany, and perfected such arrangements that the agents of the Boston and Albany Railroad Corporation would receive no cattle on their trains but such as had been examined by the Brighton agents, pronounced healthy, and whose owner had a written permit from these agents for their shipment. Other regulations were provided, by which no cattle which had been transported from beyond the State line, should be unloaded or received into the cattle-yards of Brighton, until they had been examined by a board of examiners appointed for that purpose, and pronounced free of disease. No cattle were allowed to be slaughtered after six o'clock, P. M. All butchers were required to preserve the liver, spleen and bladder of the beeves they slaughtered, and were not allowed to sell their beef until those organs had been examined by the proper officer and declared healthy.

On the 20th of August, one of the Commissioners, in company with the selectmen of West Stockbridge, visited Albany, to examine into the nature and extent of the disease prevalent there, and, if need be, to perfect the arrangements to prevent its being brought over our border. The agents of Brighton, Messrs. H. W. Jordan and A. N. Munroe, were found there hard at work, and successfully accomplishing the object of their mission, though the cattle-yards were well stocked with diseased and dying cattle, and there were strong importunities on the part of cattle owners to be allowed to transport their property beyond the limits of the disease. Every facility was afforded us by the authorities in charge of the district to get information respecting the disease, and several animals in different stages of its progress were slaughtered, that an opportunity might be afforded us for an examination. Without giving a strictly pathological description of the disease, we deem it not unimportant in this connection to state, in a general way, the appearance of the diseased animals, both before and after death. As a general rule, the first symptoms of the disease were a loss of appetite, and desire for isolation or separation from the rest of the herd. The animal soon showed indications of pain and fever, stood with all four feet drawn together under the body, inclined to lie down and get up often, occasionally stretching and turning the muzzle to the side, eyes looking wild, coat staring, horns cold. The urinous discharges of most were of a bloody color, though this discharge in many cases appeared natural and healthy. The fæces were of a slimy or mucous character, and passed with difficulty, and the mouth and tongue inclined to be hot and dry. On being slaughtered, we noticed that the blood of the animals was very thin and watery, and would not color the hand when dipped into it, and apparently without coagulating properties. The surface of all internal viscera, the brain, and the white of the eye, was of a pale yellow color. The organs of the chest appeared healthy, but it was otherwise with those of the abdomen. The milts, or spleen, in every case, were three or four times as large as in a healthy animal, and its texture soft and granulated, the kidneys dry and lifeless, the bladder inflamed and distended with a collection of bloody colored water, and in most cases the liver very much enlarged, and the gall bladder contracted and filled with a gelatinous substance. No information was obtained in relation to the treatment or cure of the disease; in fact, so far as we could ascertain, no efforts were being made to that end, or experiments tried of a curative character. The sick animals were confined to hospital grounds, and when the disease was far advanced, were slaughtered and disposed of. The regulations to prevent the introduction of cattle infected with this disease were so effectual that it is believed none were brought into the State except those first mentioned, and part of which were slaughtered in Brighton immediately after their arrival. Those purchased by Mr. Alger, five in number, were placed in a car with two northern cattle purchased at the same time, on Wednesday, August 12, and conveyed to Taunton. The cattle were yarded together until the following Saturday, when it was discovered that the western cattle were sick, and it was decided best that they should not be slaughtered for beef. On Monday of the following week, their condition was such that the attention of the city board of health was called to the case, who ordered the five western cattle to be slaughtered and disposed of as offal. The two northern animals that had been in contact with the diseased cattle from Wednesday until Monday were isolated, and kept in quarantine until the 16th of September, when they were examined by the city physician and pronounced perfectly healthy, and were slaughtered and sold as beef. The cattle of this diseased importation that went to Providence, about sixty in number, were many of them found to be in such bad condition when they arrived at their destination that they were ordered by the authorities to be killed. Others, though evidently diseased, were kept in quarantine under the care and attention of Dr. E. M. Stone, city physician, who reports, after three months, that they had recovered, and were apparently perfectly healthy. With the coming of the first hard frosts of autumn, the plague has entirely ceased in the States at the West, and there is no present danger of its introduction to the herds of the Commonwealth, though with the advent of the warm season fears are entertained that it will break out afresh, unless Texas cattle are kept entirely aloof from the cattle of the western and northern States.

Respectfully submitted for the commissioners,

LEVI STOCKBRIDGE.

JANUARY 1, 1869.

In order to devise some plan of action which might be worthy of general adoption by different States, a national convention was called at Springfield, Ill., and the various States were invited to send delegates to meet at that place in December last. Dr. E. F. Thayer, of West Newton, was accordingly commissioned to attend on the part of Massachusetts by His Excellency Governor Bullock.

The following report sets forth fully the objects and results of the convention:—

To His Excellency A. H. BULLOCK, *Governor of the Commonwealth of Massachusetts.*

In accordance with the appointment as Commissioner to attend a convention to be held in Springfield, Ill., for the purpose of devising a uniform system of measures to prevent the introduction and spread of contagious diseases among cattle, &c., and also to make a report to the Executive of the proceedings of said convention, I have the honor to submit the following: —

In the convention, twelve States and the Province of Ontario were represented by thirty-six commissioners.

The convention was organized by the choice of Hon. Lewis F. Allen as president, with thirteen vice-presidents, and four secretaries. Three stenographic reporters were appointed to take notes of the proceedings of the convention.

Dr. Morris of New York, Mr. Emory and Dr. Ranch of Chicago, Mr. McCoy of Alibone, Kan., and Messrs. Bennett, Clark and Kalb, the representatives of the St. Louis Agricultural and Mechanical Association, were admitted as honorary members.

His Excellency Governor Oglesby was invited to take a seat in the convention.

Voted, That the convention be known as "The American Convention of Cattle Commissioners."

Hon. J. S. Gould was invited to state the objects of the convention. He responded at considerable length, also describing the symptoms and *post mortem* appearances of the disease as it existed in New York the past season.

A committee was appointed, one from each State, to draft a series of resolutions in relation to a law for the consideration of the legislatures of the several States.

Several gentlemen were called upon to state their experience with the malady, also their manner of handling cattle, (the Western term for buying, feeding, and selling cattle.) Among them was Mr. Eaton, superintendent of Mr. J. T. Alexander's Broadlands farm, who handles about five thousand (5,000) head per year. He gave a distinct statement of the dates when different lots of cattle were purchased, where they were pastured, the outbreak of the disease, and the mortality. His remarks were instructive, and were listened to with great attention, as also were those of Mr. McCoy of Alibone, Kan., who described the different modes of collecting and driving Texas cattle to market, and stated that those herds which were carefully selected, properly fed and watered, not overdriven, and generally treated with humanity on the route, imparted no disease.

Dr. Morris, a member of the Metropolitan Board of Health of New York, read a paper, giving the results of a scientific investigation of the malady as it existed in New York. He was followed by Dr. Ranch, a member of the Sanitary Commission of Chicago, who gave a history of the disease in that city.

The committee appointed to draft a series of resolutions relating to a law, made a report, through their chairman, which, after discussion, was amended and adopted.

The recommendations to the legislatures of the States represented in the convention were as follows: —

The Convention of American Cattle Commissioners, assembled at Springfield, Ill., respectfully recommend to the legislatures of the several States represented therein to give effect by legal enactment to the following general propositions, which are believed to embody principles of the greatest importance, not only for the welfare of the cattle interests, but for the security of the people themselves.

Sect. 1. *First.* Three commissioners, or such other number as the legislatures deem proper, shall be appointed by some competent authority, to hold office for five years, and shall report annually to the legislature.

Second. Such commissioners shall watch over the general welfare of the animals within the State for which they were appointed, and particularly preventing the spread of dangerous diseases among them, and of protecting the people of the States against the dangers arising from the consumption of diseased meat.

Third. They may, from time to time, appoint such assistant commissioners to aid them in the discharge of their duties as the welfare of the public may require.

Fourth. They shall have power to administer oaths, and to prescribe, from time to time, such rules and regulations as may be necessary to accomplish the objects of this appointment.

Fifth. They shall give public notice of the outbreak of any dangerous disease, and such practical directions for its avoidance as they may deem necessary.

Sixth. They may either place such diseased animals in quarantine or cause them to be killed, as may seem necessary for the public protection; but in the latter case they may cause an appraisal of such cattle to be made, and the county or State shall pay such proportion of the appraised value as may be provided by law.

SECT. 2. *First.* The commissioners, or any assistant commissioner located on the frontier of the State, shall, at such times as may be prescribed by the commissioners, have power to inspect all the cattle brought into such State, whether by railroad cars, vessels, or common roads; and shall have power to detain such railroad cars, vessels, and droves of animals on common roads, long enough to make proper inspection of them, for the purpose of ascertaining their sanitary condition.

Second. No animal shall be permitted to enter the State which shall be deemed by such assistant commissioner to be capable of diffusing disease. But an appeal may be allowed to a majority of the commissioners in all such cases.

Third. No train shall be allowed to proceed unless the animals contained therein have been supplied with food, water and rest within twenty-four hours next preceding the time of such inspection.

Fourth. All animals shall rest, and have access to food and water, for twenty-four hours, after having travelled for a similar period.

Fifth. The railway companies shall provide suitable yards for feeding, watering and rest of the animals travelling on their trains, and for quarantine purposes, which shall be kept in a cleanly and wholesome condition, to the satisfaction of the commissioners.

Sixth. Each train, on leaving its point of departure, shall have certificates, signed by an assistant commissioner, which shall certify that all the animals therein are in a healthy condition at the time of its departure, and also the exact time of its departure; and such certificates and endorsements therein, of the time of arriving and the time of the departure of the train at subsequent resting and feeding places, shall be exhibited to the proper authorities wherever required.

Seventh. Proper penalties shall be inserted in the law to prevent bribery of officers charged with the execution of these provisions.

Eighth. Proper penalties should also be provided for those who interfere with or resist the officers charged with the execution of these provisions.

SECT. 3. *Whereas*, A malignant disease among cattle, known as the Texas Cattle Disease, has been widely disseminated by the transit of Texas and other South-Western cattle through the Western and North-Western States, during the warm weather of the year, occasioning great loss to our farmers, possibly endangering the health of our citizens therein:

Resolved, That this convention earnestly recommend the enactment of stringent laws to prevent the transit, through these States, of Texas or Cherokee cattle, from the first day of March to the first day of November, inclusive.

Resolved, That the interests of the community require the enactment of laws making any person responsible for all damages that may result from the diffusion of any dangerous disease from animals in his ownership or possession.

The committee to which was referred the subject of giving a name by which the members of the convention would recognize the disease, reported "The Texas Cattle Disease," as the most appropriate, which was adopted.

Considerable discussion then took place as to the meaning of the words "Texas or Cherokee cattle," to be restricted from being driven through the several States certain months in the year.

A resolve was finally passed, "That all Texas or South-Western cattle, having been ascertained, by proper proofs, to have been in the States (represented in the convention) for eight months, will be considered as native cattle."

A resolve was passed to appoint a committee of five of the members of the convention to memorialize Congress to make a sufficient appropriation to enable the War Department to fully and thoroughly investigate and report upon the nature, mode of development, and propagation and treatment of the Texas Cattle Disease.

After congratulatory remarks by the President, to the members, and his thanks to Governor Oglesby for the zeal he had manifested in the matter, and for his presence at the convention, the convention adjourned *sine die*.

THEORIES.

Many theories have been brought forward, and earnestly advocated, among which are the following: —

First. That the Texas steer carries within him a virus which is, in some way, deposited upon the soil where he grazes; that the virus is produced by the food which the animal obtains in its native pastures. It is asserted that native cattle driven to Texas contract disease and die.

The Spore Theory. The blood of the Texas and of the diseased and healthy native cattle has been examined under the microscope. It was found that cryptogamic plants, or spores, existed in the blood of all Texas cattle, also abundantly in diseased native cattle, but were not to be found in the blood of healthy native cattle. The same result was obtained in Chicago.

It is believed that the fungoid plants, or spores, are thrown out in the excrement or urine, and are taken into the stomach with the food by the native cattle.

The Tick Theory. It is said that Texas cattle, on their arrival in the Western States, have a large number of ticks attached to the skin, in various parts of the body, and that they adhere until filled with blood, when they drop to the ground, and are reproduced in large numbers — in fact, to the extent that every animal feeding in the field must consume millions of these insects daily.

SYMPTOMS.

The symptoms which the ordinary observer would notice would be those of intense fever, with pulse ranging from 60 to 120 per minute; breathing often labored, and generally frequent; loss of appetite; in cows, the almost entire suspension of milk secretion; head drooping when standing, and when lying the nose thrust hard on the ground — sometimes turned back over the side, and pressed against it; the ears drooping, back arched, flank hollow, hind legs drawn up under the body; frequent knuckling over of the hind fetlocks; disposed to lie down and get up again, which it does with difficulty; when made to move, it is often with a staggering, unsteady gait. Occasionally an animal appears delirious, at other times sleepy; the coat becomes rough; at times, frequent twitching of the muscles appears about the shoulders and other parts of the body.

POST MORTEM APPEARANCES.

The *post mortem* appearances are blood-staining petechiæ, or ecchymosis of the internal membrane of the body, especially in and around the heart, sometimes, but rarely, over the lungs, in a few cases over the lining membrane of the belly, and very generally over the mucous lining of the stomach and intestines. The respiratory passages are found healthy — the lungs sometimes very partially congested, and were commonly blown up with air between their lobules, constituting what is known in medicine as *interlobular emphysema.*

The three first stomachs are usually healthy, and especially the third, which has been described as impacted, does not differ materially, in the great majority of cases, from that state which we are so well accustomed to see in healthy cattle when slaughtered; the fourth stomach is intensely congested at its upper end, less so near the intestines, but all over may be seen, in some cases, spots of blood extravasation, in others grayish, granular deposits, and in almost all erosions of the lining membrane.

The intestines are, with rare exceptions, congested and blood stained, more or less, throughout their whole extent. The liver, often congested, is not materially implicated in the disease. The gall bladder has its coats sometimes thickened by a gelatinous-looking fluid, and its contents are dark and viscid. Its internal coat is sometimes congested. The spleen is always enlarged. It should weigh from one to one and one-half pounds, but it is found in this disease as high as five, six, and even eight pounds in weight. It is dark colored, and its structure broken up.

The kidneys are congested, and the mucous membrane within them often blood-stained. In a small percentage of cases the bladder contains clear urine; in the great majority this organ is greatly distended by bloody urine, and its internal lining is dotted with small, bright pin-point-like extravasations.

From the evidence already obtained, the following deductions are made: —

That Texas cattle, when driven or transported North in the spring or summer months, communicate a fatal disease to native cattle, although the Texas cattle appear perfectly healthy.

That Texas cattle are not subject to the same disease in Texas.

That it is necessary, with exceptional cases, that native cattle feed on the same land where Texas cattle have grazed, to become infected.

That aged animals are more susceptible to the disease than young ones. Suckling calves rarely die from it.

That native cattle do not communicate the disease to others.

That Texas cattle, after having been wintered North, will not communicate the disease.

That severe frosts remove the danger of communicating the disease, and that Texas cattle may be safely brought North from November to March.

That it is of great importance, both to the Eastern and Western people, that the traffic in Texas cattle be unrestricted as far as it can be done with safety. Through it the Western farmer is enabled to turn his rich fields of grass and corn into money, and the Eastern people are furnished with a supply of beef at a price within the means of every one.

TREATMENT AFTER SYMPTOMS.

As but little is known about the disease, but little can be said of treating it. In the Western States the turning of a herd of sick cattle into a field of green corn has proved beneficial: consequently, when practicable, cathartics should be administered.

In Chicago seventeen animals were treated with quinine and aromatic sulphuric acid, nine of which recovered. In New York carbolic acid has been administered, and highly extolled. In Cincinnati several animals were treated with the same remedy, without apparent benefit.

E. F. Thayer, *Commissioner*.

Boston, January 8, 1869.

PUBLIC MEETING OF THE BOARD

AT AMHERST.

The usual winter meetings of the Board were held at Amherst, on Tuesday, Wednesday and Thursday, December 8, 9 and 10. They were largely attended, not only by the farmers of the immediate vicinity, but by many from distant portions of the State, and were, perhaps, all things considered, the most successful series of meetings yet held by the Board.

The first meeting was held in the laboratory building of the Agricultural College, on the afternoon of December 8, and was opened by an Address from President Clark on

THE WORK AND THE WANTS OF THE COLLEGE.

Gentlemen of the Board of Agriculture, and Overseers of the Massachusetts Agricultural College:

You cannot know how glad I am to welcome you here. This college is the result of many years of thought and labor, attended with much anxiety and many disappointments; and the leaders in this enterprise have been men who have been leaders in other great undertakings, and their works testify that they were fit to be leaders in this. Five years ago to-day this Board of Agriculture held its first country meeting in Springfield, and what do you suppose was the very first subject considered by the Board at its first country meeting? Agricultural Education. Prof. Johnson, of Yale College, occupied the afternoon with an elaborate account of the agricultural schools and colleges of the world. Then what? Was that enough? No. This Board were so impressed with the importance of this subject of agricultural education, that they devoted the whole evening to it, and had an address by the agricultural orator of Massachusetts, Dr. George B. Loring, who has done as much as any other man, perhaps, to help forward this work in the recent years of effort.

This Board, as many of the gentlemen present know, had its origin in the idea that education was a necessity to successful agriculture in Massachusetts. It was established to educate the people of the State up to a point where they should be ready to welcome the idea of an Agricultural College, and to make it a success. You have done much. I speak as one who knows. I remember well the first period of my own service upon the Board, ten years ago, and I remember with gratitude the education, the training I got in that position; and I know something of what this Board has done for the education of the people of Massachusetts. I have heard men (oh, how ignorant!) talk about the possibility of this Board's being destroyed, annihilated, wiped out, forgotten. Never! This Board began its work, and by the efficient labors of a most competent secretary, it has spread its knowledge abroad through the State and the land. It has, by the essays emanating from its members,—some of them admirable essays,—on all the great topics of agriculture and horticulture, given a great amount of valuable information to the people of the Commonwealth. This Board, also, has instituted lectures, established farmers' clubs, and raised to their present degree of independent power our agricultural societies. And now, at length, we are met in the Agricultural College of Massachusetts. It is an occasion for congratulation; and, gentlemen, I, as one of the laborers, and only one, thank God and take courage.

Now, we have a business meeting, and there is work enough for us to do. You are here in the Agricultural College, for the existence of which, and the present success of which, you are largely responsible, and it is my duty, as the superintendent and overseer of this work, to tell you what has been done, and what are the immediate wants and necessities of the institution for which you have done so much, and for which you have to do so much more,—for the work is only begun. I propose, therefore, briefly to state what we have done.

This college, after many efforts, has been established in the valley of the Connecticut, in the midst of the best farming district of New England, where men live and thrive, yes, and get rich, by ordinary farming, without the benefit of city markets. We are in the midst of most beautiful scenery, in as healthy a spot as there is in Massachusetts. We are here upon a farm of 400 acres, with room enough, not only for this year, but for all coming time. The estate will be increasing continually in value; and although to-day it is larger than the college needs,—fifty or a hundred acres might answer for this year and next year,—yet it is one of those things which, if it is to be had at all, is to be had in the beginning, and we have taken and occupied it, and it is ours for the good of the agriculture of Massachusetts. So that this Board has not merely a name now, but a local habitation. We have a farm ; and this farm is not only in a place in other respects suitable, but we are here where we can enjoy the advantages of an institution of learning, which can be, which has been, which will be, of immense value to this college. Consider two or three points. In the first place, we want occasional lectures—men to give ten, twenty or thirty lectures upon subjects of literature or science. If we were obliged to go abroad and employ men to come here, we should have to pay them more than double what we pay to the professors who are on the ground, and are in every respect competent men.

Again, we have here in Amherst College,—the power and wealth of which none of you know so well as I do,—it is a power to-day but it is to be a much greater power,—we have in Amherst College, I say, a library of between thirty and forty thousand volumes. The college is about erecting a library building at a cost of $50,000. It has a fund given by Hon. David Sears, of Boston, which is to amount to $50,000, the income of which is to be used forever in the purchase of books. Now, what has been done for us here in this work ? There is a library open to the students of the Agricultural College on the very same terms as to the students of Amherst College. How long would it take us to get thirty or forty thousand volumes, a man to take care of them, and a building for them ?

Then, again, scientific collections are indispensable to the successful pursuit of the natural sciences, and scientific collections are the work of years, and require an immense amount of money and labor, and such labor as few men are disposed to give. The cabinets of Amherst College, put up at auction, would sell to-day for more than $100,000, and they represent the life-labor of three or four of the most talented men in Massachusetts. Dr. Hitchcock seems to the observer of to-day to have spent his life in breaking rocks and piling them up in Amherst College. Prof. Shepherd has spent forty years, and all the money he could save on a salary of $5,000 a year, upon his mineralogical and meteorological cabinets. Prof. Adams gave up his life, a sacrifice to his devotion to his favorite science. Three times he went to St. Thomas, and when they told him he would get the yellow fever if he went out in the hot sun, he said, "The crabs and the shell-fish haven't got the yellow fever," and kept up his work until the yellow fever destroyed him. He was a man of extraordinary power, and made a collection of shells which, for purposes of study, is hardly equalled by any other collection in the country; every specimen in its place, properly labelled, giving the country, the order, the family, the genus, the species, the variety, and everything about it. Eight thousand species and one hundred thousand specimens! Now, the only use of these cabinets is to teach students, and if a thousand students could be taught there every year, the trustees of Amherst College would rejoice the more. These treasures are of value only as they are used. Therefore, we have no occasion to go and spend our lives or fortunes in building up more cabinets; we have nothing to do but examine those at our very doors. These are not things of slight importance. But I will not occupy any more time in that direction. Suffice it to say, the college is well enough located.

Secondly, the college has some means for instruction in the way of buildings, cabinets, &c. I will not undertake to go through the list, but here you see them. Here are all these buildings on this ridge, and the buildings yonder, at the plant-house, which have grown up, under the inspiration of $130,000, in the last eighteen months. There they are, paid for, insured, and they belong to the Massachusetts Agricultural College. They are at your service. We can accommodate with board here on the premises and give excellent rooms to 110 students. So much for the buildings.

We have the State cabinet, collected during a period of twenty years at the State House, with the geological specimens gathered by Dr. Hitchcock, and the valuable collection of birds and animals made by Secretary Flint. We have a botanic museum of seeds, plants, woods and fruit models begun and in a promising way, and we have an admirable collection of living, growing plants in the plant-house, the gift of a member of this Board, (Dr. Durfee.) So that we have some of the necessary appliances of instruction.

Then we have this laboratory which, as soon as we vacate it to-day, is to be taken possession of by the carpenters, who are to fit it up for a chemical department, which is to commence its active operations at the beginning of the next term.

But now I come to the most important part of the college. All these things are what money can buy; I come now to what money cannot buy. I want you to know about those young men who sit back there. I have not very often told them what I thought of them; I have not had occasion to. They attend to their business and I attend to mine. We do not interfere with one another at all. I am proud to say, I have been a teacher twenty years, I have been connected with institutions having, on an average, 200 to 250 students, and I am free to say that I never saw a likelier set of students than these are. And now I do not hesitate to say, that there cannot be found a school in this State, certainly not a college, where the students have attended to their business better than here. I will say, that there has been no case whatever of discipline this term. We have had two classes, a freshman and sophomore class, and if there is ever a term when you may expect trouble, it is the first term under those circumstances. I desire here to thank these gentlemen, true gentlemen, of the sophomore class, that they did what I asked them to do,—treated their fellow-students like gentlemen; and never, to my knowledge, has an insulting word been uttered or an insulting look been given by a sophomore to a freshman.

Well, the boys look well enough, but the question is, where did they come from? Some men said, in the first place, we shouldn't have any students. It don't appear so to me as I look upon the large body of students here assembled. In the second place, it was said if we did have any, they would be only children—infants. If anybody wants to take hold of them as infants, they can try it. They are able to take care of themselves, and go home alone.

So much for their size and conduct. As for their scholarship, I leave that to your committee to report upon. They have attended the examination of the classes at the end of every term, and they will report in regard to the general ability of these students.

Then the question is, where did they come from? Some said, first, we shouldn't have any students; second, if we did have any they would be infants; third, if we did have any, or if they were not infants, they would not be boys who ever saw a cow, but had always drunk pump milk—a regular white-livered set of boys, sent out into the country for their health. That was the kind of boys we were going to have. Now, what have we got? Instead of no students, we have admitted, in the first twelve months, upon a written examination, ninety-six, and these boys, on their entrance, averaged more than eighteen years of age. Seventy-four out of the ninety-six understood farm labor, and had worked upon a farm. Well, that is encouraging, but the question is, are these boys going to be farmers? That is the great thing, after all. Some of our best friends, even, said, "You are doing a first-rate work; this college is going to educate the young men well, and they will go out and be shining lights in the world; but they won't be farmers." I could not say they would; and I can only say now, that all the young men, when they come here, are required to give an answer to the question "What profession have you in view?" and out of those who have entered the college, thirty-five of the older and better class of students, (if there is any choice among them; I do not think there is much,) have written down their names on the record book as intending to be farmers, if you know what that is. Forty-three have said that they have not decided; and it will be a very wise thing for them, if they have not yet made up their minds, to decide to be farmers. All I can say is, that these young men study agriculture and everything pertaining to agriculture, with great zeal. Many of the gentlemen present have heard them examined, and know whether they have learned anything about agriculture. I know they have learned a great deal about agriculture, and many other things, that they are studious and attentive, and are likely to make very respectable men.

But, not to occupy too much time with these details, I have no doubt that the students, having served as a mark to be shot at, would like to see the faculty taken up. Well, I think the faculty of such a college is a matter of great importance. I think its success, as that of all other colleges, depends much upon the faculty, and, so far as I have any influence as a member of the Board of Overseers, I mean to have a good faculty. In regard to the President, I will not say what I think just now, only this: That I have watched him pretty closely for the last eighteen months, and I am satisfied he is very much interested in his work; is very zealous and active in his country's service. And then, as to the Farm Superintendent, he has been on exhibition this forenoon pretty thoroughly, and I have kept him to himself. He has shown what he is, and I shall leave you to make up your minds about him. I will only say this, that he has had an immense amount of work to do—work that nobody can thoroughly comprehend who has not been through a similar labor. He has had two jobs which would have broken down almost any other man. The jobs themselves would have broken down, and they would have broken down the man. One was to manage the manual labor department of the college in a manner satisfactory to the overseers of the college, and satisfactory to the students too. Second, to go through a thorough course of agricultural instruction, and by lectures, and such help as could be obtained from text-books, give these young men satisfactory instruction in a comparatively new branch of study. He has done it, or else I am much mistaken in the sentiment of the class. These two things are as much as any mortal man ought to be asked to do, but that is only the beginning of his labors. He is very tough.

Then we are obliged to teach military tactics and gymnastics. We have had a pretty good drill-officer. Some of you have seen his performances below. The boys never have to wait for him. He is not afraid to work with his coat off, and he has been very prompt and thorough in his drill. I do not believe you can find another class of students who have been drilled only three months, as the freshmen have, with as little time devoted to the business, who can go through light gymnastic exercises as well as they do. That is only my private opinion, however.

Now, in regard to two other departments, which are fundamental in such an institution. The president is responsible for the botany, but chemistry and applied mathematics are two branches of the greatest importance; and I am confident we have two as good men for that business as we need to have. The Professor of Mathematics entered upon his duties at the beginning of this term, and has gone through with the term. As he is a very modest man, and present here, I shall not say anything about him. The other professor is not here. He is coming on Friday. I am very sorry he could not be here to-day, for I would like to have you see him. He is a hearty, full-blooded, wide-awake, nervous German. I will not compare him with Agassiz, but I will say he is a man of a temperament something like his. We were fellow-students in a German university twenty years ago, and he was one of the best students of his time. When we graduated together, the professor came to me and said: "What do you think of that young man as an assistant for me?" "I think he is the very best man you can find." Said he, "I think just so," and immediately appointed him his assistant. That professor is the best chemist in the world. This young man remained with him, rising higher and higher; he became a lecturer upon organic chemistry; became Professor of Chemistry in the university, and would to-day have been in that position in Gœttingen, if he had not come to America. But he had acquaintances here, and he wished to travel. He asked and obtained permission of the government to travel two years in France, England, and the United States, that he might learn all he could about chemistry as applied in the arts and in manufactures in different countries—taking the wise German course; for a man cannot build a house in Germany unless he has spent at least two years in a foreign country learning how. He came to this country, and fell in with some of his old students at Philadelphia, who would not let him go back. They took him to their father's house, and insisted on his remaining here. They were engaged in sugar refining, and they said, "We want you here; we want you to tell us what to do," and they kept him there. After that he became a teacher in Rensselaer Institute at Troy, and for six years past he has been the chemist of the salt works at Syracuse, where they make from six to eight millions of bushels a year, and where he has introduced important improvements in the manufacture, by which the salt is prepared fit for table and dairy use. But I will not give any further description of him. I know there is not a better practical chemist in the United States than Dr. Goessmann. I anticipate that he will be a light in this country, right here among this people, and that scientific investigations and experiments will be carried on under his supervision here, by the students of this college, which will redound to the credit of the State, and to the credit of this Board, as connected with the college.

But what of the model farm and model farming? We have heard some criticisms about the farming here. One man, a reporter for the "New York Tribune," came here, and he reported that he asked us what we were doing, and we said we were doing nothing; and he thought we acted very wisely in saying so, because if we had said we were doing anything, nobody would have believed it. He said the appearance of things around the college was very much like a brickyard; and he said (what was an entirely new discovery,) that it was very gravelly soil from here to Northampton, over which he travelled! and that the Connecticut River makes a magnificent bend to the college. All I wish to say is, that in these eighteen months we have done something. I grant you, not much has been done that could be called model farming, but I want you to know we have not been unmindful of the farm. We have lived here, and we have done something. This farm was made up of six different estates, was covered with old Virginia fences and hedge-rows, old orchards, and fields that had not been planted for a generation. There was a swamp south of where the plant-house now stands, that had never been ploughed in the world. I want to name one or two things that have been done. In the first place, ten acres of that swamp have been thoroughly under-drained, and are now in admirable condition for a botanic garden. They have produced one good crop of corn, and are now laid down to grass. We have torn down the old houses and moved away the old barns, except one lot, which we hope will be removed next summer. We have put a good cellar under the largest and best barn, and there it stands ready for use whenever we have anything to put into it. We have cleared up miles of old fences and hedge-rows; we have prepared twenty acres of ground for planting orchards, and vineyards and nurseries; have raised 200 tons of hay, and 2,400 bushels of corn in the ear, and these boys have dug up by the roots 75 old apple-trees. So that we have not been unmindful of the farm. That is all I claim. I do not claim that we have done much, but I say we have no reason to be ashamed of the progress made when the means we had to do it with are considered, and the fact that the president and farm superintendent have had as much to do in teaching and organizing the educational departments as they ought to have had to do, irrespective of this other work. If anybody is disposed to be captious, and find fault because we have not done more, I hope he will endeavor to be charitable, and remember that, if we have not done everything, we have done what we could.

And now I come to the important topic of my discourse, and that is, What are the immediate, absolute wants of this college? That is the important question. "Forgetting the things that are behind, we press forward to the things" that remain to be done.

First, as to the military department. I wish to call your attention one moment to the fact that the United States government, in making its grants to the States for the purpose of establishing agricultural colleges, imposed the obligation to teach military tactics, and the Act incorporating the college also requires that military tactics shall be taught. I want you to consider, further, that the State of Massachusetts has provided all the rifles and equipments necessary for the furnishing of these students with the means for military drill and instruction. Now, we have here some soldiers. You have seen the sophomore class handle their muskets. I am not afraid to put them on any field, and if fighting were necessary, (which I hope it will never be again,) I believe they would prove themselves efficient soldiers. Now, I believe that we are not only bound to teach military tactics, but we are bound to teach them well, for there is nothing that ought to be taught poorly. Whatever is taught at all should be taught well. I believe it is a wise provision that these young men shall be instructed in military tactics. They can be made expert soldiers, fit at least to serve in the infantry, without the sacrifice of any time or strength that could be profitably employed otherwise, provided we have the necessary accommodations. We must have, next spring, for a drill-hall and armory, a cheap wooden building, costing but a few thousand dollars—one hundred by fifty feet. Consider what it would enable us to do. The State has given us the arms; it does not want them stacked out of doors. We should have room for our guns, equipments and uniforms, and a place where the young men could be drilled when the weather is unsuited to out-of-door work. When the weather is good, and agricultural and horticultural operations are in order, they can work in the field. But in midwinter, and in stormy weather, how much better to have the drill! They need the exercise in stormy weather, and we want them to have it; but this cannot be unless we have a building for the purpose.

But you ask, "How have you got along so far?" We have had this building. This was erected for a laboratory before it was needed, and we have used it as an armory and drill-room; but, as I said before, to-day it is to be cleared, and from this time forward it is to be devoted to its legitimate purpose—chemistry. Now, then, what are we to do? You can see the need for yourselves, and if any of you think of any better plan, I wish you would talk with me privately about it.

Secondly, what do we need to enable us to go forward in the course of study which has been approved by the gentlemen of this Board and other friends of agriculture? In the first place, we want a room where the students can meet together. It would be a queer college that had to assemble out of doors. I want to see all the students every day: they want to see me, perhaps, sometimes; at any rate, they are willing to. I must have a place where I can meet them. This room is to be devoted to chemistry. It cannot be used as a public room, and if it could, it is not large enough. We are to have more than this room full of students. We must have a room where the students can come together for devotional exercises every morning, and for the general purposes of the college. We must have a hall for exhibitions and for the meetings of the Board of Agriculture. The annual meetings of the Board that are held for lectures and discussions should be held on the college grounds if we had a hall. Then we want a room for these young men who have organized the so-called "Ben Franklin Society." These young men are proposing to educate themselves to be intelligent citizens; and, among other things, they expect to be able to express themselves tolerably well upon paper, or before an audience like this, and they must practise. Practice alone gives power. They are very zealous in this work. They have been very active during the past year, without any special oversight on my part, though I have endeavored to have them feel that I was interested in their success, and they have made great progress. Now, they should have one or more halls, where they can collect a library, bring together their papers, and feel that they have a home, as a literary society.

Again, we greatly need rooms for the college library and cabinet. The present south dormitory is occupied by the cabinet, library, treasurer's office, reading room, and recitation room. All these things must leave that building, or we must have more dormitories before another class can come in. We want a room for the cabinet. It should be in one room, safe from fire, and it should be well arranged and cared for.

Then, we must have an apparatus room, and a lecture room for the professor of physics and applied mathematics. He must have a place where he can keep his apparatus and give his lectures. In the same building, on the lower floor, we want rooms for lectures upon agriculture and an agricultural museum, where we can collect agricultural implements, models, agricultural products, and whatsoever is of interest to those who are studying agriculture. We want them convenient, so that when we take our lecturers into the agricultural lecture room to lecture upon particular subjects, they can there find all the means of illustration.

Then, the building that has been built this summer as a dormitory has underneath a commodious basement, one-half of which should be fitted up as a bathing-room, and the other as a tool-room, where the students can keep their hoes, axes, rakes, and such other small tools as are designed for daily use. They want them here, ready to their hands. They do not want to go off to the barn, because their work may be in the other direction. They should have their tools right where they keep themselves.

In regard to our educational wants, I desire to add simply this: We need these additional accommodations in order to make room for more students, and to enable us to carry out our course of instruction. Then we want scientific apparatus. We have professors, we have students, we have a laboratory, but we have nothing with which to buy scientific apparatus. We want money to buy chemical, philosophical, engineering and surveying apparatus. We want books of reference, to be kept in the library, with the books which some gentlemen have so kindly and generously given us, and which some other gentlemen are going to give us. We want apparatus, I repeat, and apparatus rooms.

So much for educational matters. These are immediate wants, and they are the more important because we are now in our second year, and before our next annual meeting here we are to have our third year; and the second and third years of any college are the years for scientific study. These are the years when we want to teach chemistry, surveying, natural philosophy. We require these things next year — that is, we must do something this winter. But we absolutely need this apparatus next summer and winter. In order that these young men who have come forward and given the college such a start may be carried creditably and safely through their course of study, we must have this apparatus, and have it before another year.

Finally, the agricultural and horticultural wants of the college are these, which I know you wish to supply: We must have model farm buildings, and the chairman of your committee is here prepared to report his plans for a new barn. The next thing is a supply of soft running water, and enough of it. All these old barns along here had lead pipes brought down from the hill, that furnished an ample supply of running water. Certainly this college, with all these buildings, ought to have as much. We have a plan for a reservoir which will hold thirteen millions of gallons, in yonder hillside, which can be built for a few thousand dollars, and the water brought down, through a four-inch pipe, to the new barn, and straight along in front of these buildings; and then you can have water for your botanic garden, — which is indispensable, — water for your stock, water for all ornamental and useful purposes, and for security in case of fire. Certainly, with all these needs, we ought not to be out of water, when there is plenty of it running to waste on the hillside.

Then we want some stock — model animals. These young men have been studying dairy farming. Your Secretary has lectured upon the Dairy and Dairy Farming, and has told them of the Jerseys, and Ayrshires, and Shorthorns, and Devons, and the little Brittanies, and so on; and they want to see what they look like, and they ought to see. This college must have some model animals. You all know it. We have plenty of pasturage and plenty of hay, but nothing to eat up either grass or hay, and we have to sell the crop. We want these pupils to study the laws of breeding; and if we had but a single pair of each one of the improved breeds of cattle, sheep and horses, for the purposes of experiment, think how easy it would be to acquire information here! You could get more knowledge, in a walk of half an hour through a barn with that man [Mr. Stockbridge, who entered the room at this moment], than in a lifetime out of books. I would not give a cent for the opinion of a man whose judgment is based solely on books. He must know the difference between a good animal and a bad animal of the same breed, and between an animal of one breed and an animal of another breed. Now, we have books and lecturers, and these students are being taught, eloquently, in theory; but they must come down to *things*. It is impossible to teach a man natural science without specimens.

We need also for the farm here—oh, how much! — money for draining, fencing, grading, planting. We ought to plant orchards, vineyards, a botanic garden; and we could spend a few thousand dollars in that work so as to make a beautiful show in a year or two. These students are all ready to do the work, if somebody will only give them the means.

I have thus laid before you as many things as I think it will do to talk about now, for fear you will forget some of them. I beg pardon for occupying so much time; it is only because I believe you are the true, earnest friends of this college; and if it ever succeeds, it will be because it has help and sympathy from the farmers of Massachusetts. When I talk to you, I talk to the farmers of Massachusetts. Somebody said, many years ago, to Hon. John Brooks of Princeton, in regard to some project for agricultural improvement, "Why, you can't get this thing through the legislature." His reply was, "I tell you, whatever the farmers of Massachusetts say they want, the legislature will grant." It always has been so, and I believe it will be so for some years, at least, to come. Therefore, I hope you will make up your minds as to what this college should have, then have the wants of the college made your wants, and your wants the wants of the farmers of the State, and then the legislature will grant whatever is necessary to carry out these plans, and to obtain these things which are so essential to our success.

There is one other subject on which I wish to say a single word, and that is in regard to the importance of a fund. All our institutions of learning get money, and there are men thinking about giving this college money. Some individuals, if I remember rightly, have given it money, and I only wish there might be a great many more of the same sort. Now, I know that the first step towards getting money is to put before men of wealth and liberality a genuine good object. People do not go round this world looking for objects to give their money to; they must be thrust upon their notice, so that they cannot help seeing them. Now, I propose to name an object of the utmost importance, and one well worthy the consideration of any wealthy and generous man, and that is this: Here are students seeking an education, who are poor. They want a chance to earn money. They do not ask you to give them a dollar, but they say, "Let me work for you; pay me what you can afford to, and I will secure an education." Now, gentlemen, those are just the young men I like to educate. They always study well and behave well, and it always pays to instruct them. I have been one of them myself, and I feel a sympathy for them, and I desire somebody to give this college a fund of $100,000, to be called, if you please, "The Labor Fund," and which shall serve three most important purposes. Amherst College has $100,000, called "The Charity Fund." I do not want this a charity fund; I want it a labor fund. Amherst College students receive as a free gift the income of that money; I want these students to receive it for services rendered; that is all they ask. They do not ask for charity; but if you will give them fair wages for work done, and give them the work to do, they will be thankful.

Now, what would such a fund enable us to do? In the first place, to educate these students, who are so well worth educating. In the second place, it would keep the college full; there would be always students enough. That is desirable. And, finally, it would enable the Superintendent and President to keep things all in fine order. We cannot pay these students a dollar now, except for something that will come back in the shape of money. If we can get them to husk the corn, and then sell the corn, we can pay them money. But we want some gardening and farming done that will not pay in money. There are to be experimental farming and gardening, and gardening for the purposes of science; there is to be ornamental gardening here, and there is to be work for the cultivation of taste. These things do not come back in money, and hence we cannot pay out money to the students for this kind of labor. So you will agree with me, I am sure, that we want about $100,000 as a labor fund. If you know anybody who is anxious to give it, just refer him to me.

Without occupying any further time, I will ask Mr. Alexander Hyde, of Lee, Chairman of the Committee, to report upon

A BARN FOR THE COLLEGE.

The Committee on Plan of Barn for the Agricultural College at Amherst respectfully submit the following Report:—

Your Committee have labored under some embarrassment, in consequence of the remoteness of residence from each other, which has prevented that concert of action which is so desirable. Our zeal has also been somewhat abated by the fact that the trustees of the college last spring decided to renovate the barns already standing upon the college grounds, and we feared we might be "carrying coals to Newcastle" in offering them a plan of a barn. We are also well aware that the powers of the Board of Agriculture in the matters of the college are only supervisory, and we feared the trustees might accuse us of offering advice before we were asked. Notwithstanding these embarrassments, we have kept an eye out for all the famous barns of the State, and some out of the State, and have also studied many plans of barns which we have been unable to visit, and, with much distrust of our own judgment, submit the accompanying plan.

We find great diversity of tastes in barn architecture. There is no Corinthian, Doric, nor Gothic style, the general principles of which we can follow, and we are surprised to find so few really convenient and tasteful barns in the country. Our fathers, coming from a country where the winters are comparatively mild, and where a large share of the hay and grain is stacked and the barn consequently of secondary consideration, did not pay much attention to their out-buildings. The model of a puritan barn, which has been too closely followed, was a rude structure, built on a foundation laid on the surface of the ground without mortar, and tossed about by the frosts. The siding was of unmatched coarse boards, put on with particular reference to ventilation. The size was thirty feet by forty, or forty by fifty, as the size of the farm demanded. The "big doors" opened upon a threshing floor which ran transversely through the building, giving stable room on one side and a mow on the other. A shed on one side of the barnyard gave some shelter to the young stock at night, but during the day the cattle were generally at liberty to roam and browse where they pleased, and find water where best they could, generally at some neighboring brook. We have known some of these barns so located that a brook ran through the barnyard, which is certainly very convenient for the cattle to drink, and also saves the hauling of some manure. We are glad to say that these rude structures are very generally giving place to more convenient and comfortable farm buildings.

In the opinion of your Committee the four principal ends in the construction of a barn are: commodious storage for the crops, comfortable quarters for the stock, economical saving of manure, and convenient performance of labor. We are not so vain as to suppose that we have perfectly accomplished all these ends in the plan submitted for your consideration. We have aimed at them, but may not have hit the mark. The building we propose is 150 feet by 50, with a barn floor running longitudinally, stabling for horses and cattle on one side of the main floor, and a granary and mows on the other; a cellar under the whole, in which there are stables for cattle at the ends, each 50 feet in length; a root cellar 36 feet by 22, a wagon and tool room 36 by 22, five box-stalls of different sizes for calves and breeding stock, and the balance of the cellar room a receptacle for manure. The whole of the cellar is well ventilated by box flues running to the roof. The bents of the barn are 12½ feet apart, and the posts 20 feet high. The whole capacity of the building is sufficient for storing 200 tons of hay, allowing 600 cubic feet for each ton, and stabling 70 cattle, allowing 3½ feet for each stall, exclusive of the box-stalls. On the main floor is a Fairbanks patent for weighing hay, grain, and stock. The building is simple in its structure, and can be enlarged or contracted at pleasure; and in its general design can be adapted to a farm of one hundred acres or a thousand. As marked out on our plan, it is designed only for horses and cattle; but one end of the cellar can be conveniently arranged for sheep, pigs, and poultry, or a wing can be attached at right angles with the main building, in which additional stock can be kept. The building is designed to run east and west, and the principal stabling is on the south side, as we consider the vitalizing influence of sunshine of the utmost importance to beast as well as to man. Good air we deem as essential as good food, and this is secured by ventilators from the stables both in the basement and main floor. For the minute details, reference may be had to the plan of the architect, C. T. Rathbun, Esq., of Pittsfield. Perhaps we ought to add that the main floor is marked out as 13 feet wide, and that the main stable, which runs the whole length of the south side of the main floor, is fifteen feet wide, and is arranged for stanchions, with a manger in front of 2½ feet in width; a platform for the cattle to stand upon of 4½ feet; a gutter in the rear 2 feet wide, furnished with trap-doors, to let the manure into the cellar; and a platform of some five feet in width in the rear of the gutter, which serves for a walk. Shutes are also arranged on the sides of the main floor for pitching hay to the stables in the cellar, and for dumping roots of various kinds into their appropriate bins. Steaming apparatus can also be arranged in the cellar for steaming roots, hay, and stalks, but for this no space has been marked out. If there are any suggestions in the plan submitted which will recommend themselves to the Board, or be of service to the trustees and to the farmers generally in the State, we shall feel that our labor has not been in vain.

Respectfully submitted,

ALEXANDER HYDE, *Chairman of Committee.*

JOHN B. MOORE, of Concord. I agree with the outlines of the barn, but I do not like the interior arrangements at all. I will tell you why. The entrance to the cellar, as you see, [pointing to the plan] is on the side, and before spring the manure would block up the passage so that there would be no access to the wagon and tool-room. Then, I think the cellar is no place for a tool-room, because the tools will rust, and it is inconvenient to have to go down cellar to get your tools to work with. It is no place to store ploughs. I don't know how you are going to get them down there. You cannot get them down there without carrying them down stairs.

I see the necessity of having room to store hay, but my idea would be not to have any cattle stalls in the cellar, and to have some way of getting into the store-room without going over the manure. If I wanted more room to tie cattle, I would take this, which purports to be a haymow, and use it for these cattle pens.

In the discussion which we had here last winter, a good deal was said about root cellars, and I believe Mr. Stockbridge found a great deal of fault about going down cellar to get roots, and thought they ought to be on a level with the barn floor. I do not think that is so objectionable as Mr. Stockbridge does, because the roots can be sent up by an elevator; but if that is really an objection, and there isn't room enough for hay, I would get over it in this way: I would make the posts eight feet higher, and use the whole cellar for manure; I would put the cattle and the box-stalls on this floor; I would make the entrance to the barn within four feet of the plates, and thereby do away with the use of the horse pitchfork to a great extent, if not entirely.

I think no barn should be put up by the trustees of the Agricultural College that cannot be copied by the farmers of the State. It should be put up in an inexpensive manner, and should be such a barn as a farmer could build who expected to make money out of his operations. That is such a barn as I want to see built. The general outlines of this plan come up to my idea, but the interior arrangements and the entrance I do not like. Otherwise, I should endorse the plan. I agree with Mr. Hyde, that but very few farmers are of the same opinion in regard to a barn.

The PRESIDENT called on Dr. Loring to give his views of the proposed structure.

Dr. GEORGE B. LORING, of Salem. I have had no opportunity to see the plan of the barn which Mr. Hyde has presented, and none to read the report; and while I agree with my friend Mr. Moore, that it could be improved upon, I do not think I should go to work to improve upon it precisely as he would.

I agree entirely in the objections which Mr. Moore has made to the cellar. I think a barn cellar is not a good place to keep tools in, and the objection he makes to getting an ox wagon or cart or a horse wagon over four or five feet of manure in order to get it stored, is certainly worthy of consideration, by those of us who would have to get wagons and carts in there and out again without boots prepared for that purpose.

Why this plan of a barn has ever been decided upon so universally, it will be somewhat difficult to determine. This plan which Mr. Hyde has presented here is a plan which has been adopted in New England for a great many years. I see gentlemen in this room who know well the old-fashioned form of barn, as it was understood in Essex County, and which was the antecedent of the very barn which Mr. Hyde has alluded to this afternoon on my farm. The old barn was shaped very much as this is, but instead of driving lengthwise through it, there were two passages on the side of the barn, driving across it, and the great mass of the hay was between these two passages. The cattle were tied at each end of the barn, facing toward these passage-ways. The difficulty with that barn was manifest. In the first place, all above the floors to the ridgepole was waste room, unless you put in shifting platforms. In the second place, it was not so easy to pitch the hay into that bay, as the hay rose to the very top of it. It was not so easy a thing to be done by our ancestors that we, who are somewhat more feeble, should be willing to follow them, unless they handed down, with their barns, their shoulders and backs, which we do not find that they often did. They built some improved barns, and they drove lengthwise through them. Then what did they arrive at? At just what Mr. Hyde has here,—an admirable place for the tying of cattle, and room to store hay over the cattle and in the bays opposite. They saved all that room. They got at one point. The object of the barn here in New England is to store as much hay and fodder as possible, and as near to the cattle as possible. Labor is worth more than anything else, and the transportation of roots or hay to any distance, either by barrows or a railroad arranged in the barn, is a matter of inconvenience and takes time, and this work was to be done as quick as possible. The object, therefore, was, to make room for as many cattle as possible, and to store food enough to keep them through the winter.

This plan which has been adopted is undoubtedly, take it all in all, the best plan that has been conceived. We have octagonal barns, but nobody who ever built one has ever built another. I have heard of a man who built one, but he never advised his neighbor to follow his example. They remind me of an octagonal house which a friend of mine once visited, and told me it made him feel sea-sick! There is no saving of timber in building them, and no saving of room after you get them built. A simple barn, then, is what you want.

Now, this plan which Mr. Hyde has proposed here, in itself, is a good one. I doubt about his posts a little. He makes them twenty feet high. I think eighteen feet high enough for any posts. You do not want your mow over your cattle too high, for these reasons. In the first place, it is cold weather that we live in the chief part of the winter. You don't want the room in which the cattle are kept so high that it is difficult to warm it without an air-tight stove; and the nearer you bring the ceiling over the heads of the cattle, always provided that one can walk underneath without hitting his hat, the better, and the more convenient it is when you come to pitch the hay up on to it. Eighteen feet is high enough. When you come to add eight feet more on to the twenty, and make it twenty-eight, as Mr. Moore proposes, I don't know where you would land.

Cattle should be tied upon the sunny side of the barn, where you can give them abundance of air without chilling them, and where all the sunlight we have in winter will reach either them or the place in which they stand. That is provided for by this plan. Mr. Hyde has got this barn one hundred and fifty feet long. You can tie in that length fifty-two cattle, and you can undoubtedly store away fodder enough to keep them in the bay opposite, in what I shall describe hereafter as the mows over their heads, and in the mows which can be furnished over the driveway. This is a very warm, comfortable, convenient place for them. This I approve of and go in for. I would, if possible, have the manure on the side of the cellar which is most accessible, and so I would have it on the front side. You will say that the manure will fill it up, but if you will adopt the convenient little arrangement to which Mr. Hyde alluded, that is, closing up this space not with upright doors, but with doors falling off at an angle, that difficulty will be avoided. That arrangement is desirable, for two reasons. One is, that it gives room for the manure which falls from the cattle; and the other is, no man can leave the door open, for it won't stay open; it has either got to swing back or shut. So I would have the cattle stand on the south side of the barn, and the manure falling down in this way, it is easy of access, and as you work it over in winter, you can throw it back into the cellar. You will have plenty of room, and, at the same time, a good opportunity to drop sand or muck on the spot where you would naturally work the manure in working it over.

Now, you will see that Mr. Hyde provides more conveniences than that. He has got a chance for the cattle at the ends of the barn in the cellar. I never would put any animal down in a cellar. I am satisfied it is no place for an animal any more than a man. You ought not to make an underground dwelling for anything that is more finely organized than a woodchuck or a skunk. A man cannot retain his vigor shut out from the sun, and beasts cannot. You cannot keep a horse in a cellar and keep him in good working condition, and it is so with all animals. They need air and light more than they need intense heat; and I am satisfied that it is imperatively necessary to the preservation of their health that they should be stabled above ground, where the damp vapors of the earth will not reach them, and where they will have an abundance of ventilation, and, what is more important still, to the animal as well as to the plant, plenty of light. You cannot raise corn in your cellar; you cannot raise potatoes there. They must have light just as much as heat, and animals require light just as much as plants do. So, under no circumstances would I put my animals underneath a barn, or in a barn-cellar, if there was any way of preventing their freezing to death in a wooden structure built above it.

This, you may say, is all a whim, but it has been ascertained to be a fact, by scientific investigation. Dr. George Derby has just published an admirable paper on ventilation, in which he shows, after careful investigation, that many diseases arise from the want of proper provision to protect ourselves against the dampness of the atmosphere that is all around our houses, and especially in our cellars, and I have no doubt he is right about it; and when I tell you that an animal is organized as nicely as we are, without the intellect to protect himself, you will see that we must take as good care of our cattle as of ourselves. So, I am entirely opposed to putting any animal, unless it is a hog, under ground ; and I have come at last to have so much respect for my hogs that I won't put even them there.

Now I am at that point, let me tell you that no farmer can make a piece of pork that is right (unless he inherits the dainty palate that our fathers had,) from a hog that is raised in a cellar. A farmer in Essex County asked me how I found that out, and I told him it was the natural consequence of keeping the animal where it did not belong. It is just as fallacious to expect to make a healthy animal in an unhealthy place as to expect to raise healthy plants in unhealthy localities and on improper soil. So, I say, have every convenience for keeping your cattle above ground, and this provision which Mr. Hyde has made is as good as can be.

But you say there is not room to put your granary in one of the spaces between the posts. Put your horses in the space between the posts, at the left of the driveway. There is a very simple and admirable plan by which a passage-way can be arranged, so that you can have your granary in the space next to the horses. If you want a tool-room, put it in the space next the granary. The tools will then be above ground, and will not rust out ; and tools rust out sooner than they wear out, in ordinary labor. Have your box-stalls in the space next to the tool-room, your calf-pens, &c. But you say you have taken all this side for the cattle and horses, the tool-rooms, the calf-pens, the box-stalls, and all that sort of things,—how are you going to provide for your hay ? Put in, as every ingenious man does now, what I found in my barn when I took possession of the farm, a shifting platform over the driveway. Whoever invented it was a smart man, and ought to have a premium. It is the most convenient thing I ever saw, and why it is not used more I cannot tell, and never knew anybody who could tell. What is this shifting platform that I speak of ? I built my barn so that when the hay is all out of it you can walk through it and look up to the ridgepole. It is nothing but a frame, boarded and shingled, with cattle on one side, and meal-rooms and horse-stalls on the other, all below the level of the mow-beams. You can see, all of you, that all above the beams is clear space for the storage of hay. When I get the side mows filled, I put a piece of timber across from one mow-beam to the other, and so, vent after vent, in long rows or tiers, I make shifting mows, and my men can pitch my hay from the mow-beams, right over the driveway, to the ridgepole. It is one of the simplest ideas ever conceived of; and when you get your hay out, you have not got fifty thousand nooks and crannies filled with cobwebs that you want to get rid of,—you have got a sweet, clean barn, where you can stand up in summer and look straight up to the ridgepole. It is, I say, a very simple thing, and, once tried, will never be abandoned. With the use of a horse-fork, in this simple and ingenious way, you avoid the necessity of having a great number of men to throw the hay back after it has once been taken from the load by the fork.

That is the internal structure of a barn that I should approve of. It is simple, in the first place; it holds an enormous quantity of hay, in the second place; it will hold cattle enough to satisfy any ambitious man, no matter how large his farm is, in the third place; and, lastly, it puts under one roof all the farm conveniencies. Roofing is expensive; and it is so expensive, that one of the most thoughtful farmers in this Commonwealth said that it was more expensive to build a shed to keep his calves in than to let his calves suffer from the weather—taking it twenty-five or thirty years together. I do not indorse that statement at all; but still, after a close calculation, he came to that conclusion. So, I say, avoid all the roofing you can, and put everything under one roof that you can.

Now, what is the objection to Mr. Moore's plan? Why, you have got your posts 28 feet high.

Mr. Moore. Will you allow me to explain a little? I said that if, after changing the arrangement, so as to bring the cattle out of the cellar, it became necessary to have more room for the hay, I would raise the posts.

Dr. Loring. Would you have them as high as 28 feet?

Mr. Moore. I don't think I should, if I had storage-room enough without.

Dr. Loring. Twenty-eight feet posts, in these times, when pine trees don't grow as big as they used to, are not easy things to get. A barn with posts 28 feet high is going to be expensive to build. We want economy here. We are going to set a good example in barn building. You want an economical thing, without the trouble of a driveway under the roof. I have no doubt Mr. Moore has seen good barns among the Shakers, but outside of the Shakers, where most of us live, I have never known a man to build a barn with a driveway under the roof who has not denounced it. One of the shrewdest men I have ever known said it was the last barn he would ever build. And why? It was an expensive barn. He had to put in timbers as strong as the deck timbers of a man-of-war. He had to make the floor so stiff that when he drove in with a couple of tons of hay on the load, it would not start, and he found he was in trouble at once. Then what did he lose? Why, he was close up under the roof when he started, and he lost all the space from his driveway down to his floor—the whole of it. He could not put anything there; and there was this immense space lost, simply because he thought it was easier to pitch hay down into a bay than to employ a horse to pitch it up under the ridge-pole. I think the plan of a barn with a driveway under the roof is all wrong. It requires, in the first place, a hillside, and everybody has not got a hillside. If you have not got a hillside, it requires a great deal of wharfing, and that requires stone work, and stone work is expensive, and filling in wharfing is expensive. I want to get at this thing economically. Imagine a man proposing to build a barn on a perfectly level piece of ground. If he takes a plan with a driveway under the roof, he has got to build two wharves, one at each end. He gets it done, and finds that it is not long enough, and he wants to lengthen it. This plan of Mr. Hyde would allow him to make it as long as he pleased; but what shall he do? He does not want to tear down his barn and build greater, because there has been an example of that sort set, the result of which does not encourage any other man to follow it, and how can he build on to the end of a barn that has got a wharf as high as the door would ordinarily be? He has got to move that wharf in order to lengthen his barn, and I insist upon it, that it is the opportunity to lengthen a barn that makes it economical and satisfactory to a thriving farmer. These are the reasons why I would not drive under the roof. I do not think a barn can be built economically to drive under the roof.

Then there is another reason why I would not do it. You will go into a great many barns in which there is let down from the top of the posts, about four or five feet over the driveway, what is called a mow. There will be a square hole cut through that mow, and you are expected to pitch the hay up through that square hole. What is the object of that thing? In the first place, it is to store the hay. My shifting platform provides for that. In the next place, it is to make the barn warmer. Fill a barn with hay, and it will be warm enough, I warrant you. But they forget that it weakens the frame. A great building, built without stout walls, a simple framework covered with boards, must have a strong frame. If you leave your posts standing there, with nothing across to support them, how are you going to prevent your barn from spreading? Imagination! It is not imagination. One of the best barns I ever knew did spread in that way, so that the tennants came half-way out of the mortices, broke, and down came the whole concern; it was lucky the owner was not under it. If you want your barn to stand firm as a rock, you must have your plates go right across from one post to another; then it will hold almost anything. That is the general principle. If you want to make your barn firm, and stand for seventy-five years,—if any wooden building can stand so long,—be sure to get rid of this sort of thing, which cuts your barn right through in the middle, and lets the strongest portion down five or six feet from the spot where it ought to be to hold it together. It is simple, too. It costs more to cut a mortice-hole now than it did fifty years ago. These are the reasons why I object to this complicated structure, with a driveway under the roof.

I have given my objections to keeping cattle in a cellar; I have provided all the arrangements for horses, cattle, tools, and a granary in this one building, and in such a way that it will be convenient and economical, and furnish at the same time plenty of storage for hay. Now, what will you do with the cellar? Mr. Moore said he would keep the manure in it. I almost always compost my cow manure, as was recommended by Col. Moses Newell, in a very sensible address, delivered before the Essex Society last year. If you are cultivating clay soils, compost with sand; if you are cultivating light soils, sandy loam, compost with muck, and so on. You have abundant opportunity to manufacture all that in this cellar.

Then another thing. There has been some debate as to whether roots should be kept under ground or above ground. I tell you, with a temperature ten or twenty degrees below zero, it is not an easy matter to keep them from freezing below ground, without undertaking to keep them above. You want to unload them conveniently and easily. How are you going to do it? Put right in the middle of the barn a root cellar, with ventilation pipes running up through to the roof, if you desire; put windows in the cellar wall underneath the barn, and bring them far enough forward to have a large scuttle hole there, that you can drive over and dump your roots through it. Just as simple as wheeling a load of gravel and dumping it into the road! All you want then is a boy or two to toss them away from underneath the scuttle-holes, for two reasons: one is, to make room, and the other is, you cannot keep either mangolds or turnips with so much heat as dumping one load on another would make; they would heat and rot; they must, therefore, be moved. But it is as convenient as anything can be, and easily ventilated.

Then, when you want to use them, what are you going to do? You say you don't want to bring them out of the cellar. Very well; I don't blame you much for that. How far is it from this trap-door to this floor? You can go down and throw them up by hand, if you want to. If not, you can rig a box or barrel with a pulley, lower it down there, fill it, hoist it up, and you have your roots. Then you have all this room clear to set up a root-cutter. You have your root-cutter within five feet of the stairway leading down into the cellar, and your roots are easily brought up. They will not freeze; the cellar is easily cleaned out, and convenient, and then you have all the rest of that cellar for making manure. I assure you that a barn long enough to hold fifty-two head of cattle will require four and a half feet of room in the cellar, per head, to hold the manure that will be made — always taking it for granted that every prudent man puts up his cows at night, the summer through.

I have taken more time than I ought. I agree with Mr. Hyde in his report. The suggestions I have made, I have made because I was asked to do it, having had no other chance. I think, considering the room required, the economy and strength of the building, and the convenience of it, the suggestions I have made are, at least, worthy of respectful consideration.

N. S. Hubbard, of Brimfield. There is an impression that the discussions are to be confined expressly to the members of the Board. I will read two lines from the notice of the meeting, which will dispel that delusion. "All persons interested in agriculture or horticulture are cordially invited to attend the meetings, *and participate in the discussions*." There is a gentleman near me who tells me he is about building a barn nearly of the size of the one reported by the Committee, and perhaps he will give us some suggestions.

Mr. Ellis, of Warren. I can state the plan of a barn that I am about to build. It is 150 feet long by 43 feet wide, with a cellar under the whole, the floor running lengthwise through it, and the stable on one side. I do not agree with Dr. Loring exactly. He has got fifty-two head of cattle in the barn. I should say that was too many.

Dr. Loring. I think I was mistaken in the number. One hundred and fifteen feet will hold thirty-two head of cattle.

Mr. Ellis. I should put them thicker than that. Three feet and a quarter will do. On the opposite side — the bay side — there are stalls for two horses and four oxen, with a granary. The posts are to be 18 feet, the beams to be set down 3½ feet, and I am to have the scuttle-hole that the Doctor spoke about. According to my experience, that barn, full of hay, will carry through fifty-four head of grown cattle and two horses. I build it in the cheapest way I can, because I am not able to put on much, if any, flourish. As to putting cattle down in the cellar, I should not do it on any account whatsoever. You will need the whole of your cellar for manure. I should build a cellar for roots outside of the barn. There is a large amount of moisture comes from the roots, and unless they have air, and a good deal of it, too, they will rot. It may be ventilated from the bottom to the top, as the Doctor represented, but that would not answer for me; I would rather build a cellar out.

I think a barn ought to be proportioned to the amount of stock; but still, we farmers sometimes get more hay than we have stock to consume it, and summer over some. I have followed the plan of Dr. Loring in building this temporary scaffolding, although not to much extent, because the barn I now occupy is 150 feet long. It has one end piece, and then a crosswise piece. It was originally a barn 30×40, and I have built all around it, except on the back side. It is now likely to tumble down, and I must repair it, or build a new one.

I have heard some discussion upon this matter of barns. It is a very difficult thing for people to agree upon. A man may think that if his barn suits him, it is no matter whether it suits anybody else; but this ought to be a barn to suit a great number. A barn ought to be proportioned to what is to be put into it. There is no use in building a barn for more hay than you can put cattle in to eat it, for I don't believe in keeping cattle out of doors and feeding out of doors.

The plan of this barn is very good. It is just like the one I talk of building, only it is wider. You may, by adopting the principle that Dr. Loring has laid down, cover your floor from the scaffolding up; you may keep two stables, and there may be hay enough, if you fill the barn, to carry the cattle through.

Mr. STONE, of Dedham. I was unfortunate, or fortunate, enough to buy an old farm encumbered with old buildings. Among them was an old barn 33×50. I had not the time, neither had I the means, that I wished to appropriate to that purpose, to tear down the old barn and build a new one, although I have since repeatedly wished that I had done so. I believe it would have been much cheaper. The ground elevation of this barn reminded me of that old building. There was a partial cellar under the barn, and it had a long shed attached to it, of no earthly use to anybody. I tore that entirely away, raised up this old barn, and added thirty feet in length, which leaves it 80×33. It is a small affair, as you understand. Entertaining the opinion that the odors from the manure-cellar, and the presence of cattle, added nothing to the sweetness of the hay, I made this new part that I added to the old barn a stable for my cattle. On the scaffold over my cattle-stalls, in this new part, I calculate to store my litter, corn-stalks, and anything I am going to use up at once, and don't care much about. I have taken away the cattle-stalls from the old barn, and made a bay, which gives me plenty of storage room. I left in the end of the old barn, as a partition between the old barn and the new, wishing to divide my cattle-stable as much as I possibly could from the old barn, believing, as I did, that the breath of cattle, with the steam arising from the manure-cellar, would be no benefit to the hay that I had collected there so carefully to feed my cattle through the winter. Consequently my manure-cellar extends no further than my new addition. You will all understand that the manure-cellar is the exact dimensions of the cattle-stable, leaving the cellar under the old barn for the storage of roots, teams, carriages, &c. Instead of taking down the whole of the mow timbers, I left room at one end of the barn for the storage of tools, and on the opposite side I left another apartment for the storage of ploughs, &c. All I have to say is, that I like the barn very much. It carries out my idea of keeping the cattle free from the hay, and I expect that the cattle will be benefited by receiving their hay in the sweet, natural state as it came from the field. I know a great many people do not agree with me that the breath of cattle and the steam from the manure-cellar injure hay; but I cannot see why they should not. Of course, I have suitable ventilation on top to take off everything.

President CLARK. We have present with us Professor Wilkinson, of Maryland, who has given a good deal of attention to this matter of building barns, and has built some famous ones. He has some new ideas, and I hope he will favor us with some suggestions.

I would say, in reference to this whole matter, that I hope we shall get all the information we can upon it to-night. I do not know that we shall have any other meeting for the consideration of this subject at this time; but the Board has undertaken to decide upon some plan, and we have got to do it. All I can see that it is possible for us to do is to hear what we can, think what we can, and then at our annual meeting in Boston take up the subject and decide upon something, if we do not do anything else this winter. We have undertaken this work, and it would certainly be a shame to the Board of Agriculture of Massachusetts if they could not agree, by a majority vote, at least, upon a plan for a barn. I hope that this thing, undertaken for the benefit of the college, and of the farmers of the State generally, will be carried out to the end. I do not know how we can better spend the remainder of the time this afternoon than in hearing the views of Prof. J. Wilkinson, rural architect, who, being a resident of Baltimore, Md., may not be present when we have the subject up again.

Prof. WILKINSON then presented a plan for a frame farm barn, which embodied some peculiar and original features. The building which Mr. W. presented drawings for was 103 × 40 feet, in the plan. It was arranged with a basement and one story, adapted to a hillside site, with a southern aspect. The height of basement 8 feet in the clear; the posts of the principal story 20 feet in height.

The basement room is devoted to cattle stables for thirty head, eight horses, a farm and market vehicle, and implement room, 38 feet 6 inches × 18 feet, and a feeding passage 16 × 38 feet 6 inches, which is under the main driveway on principal floor, and another feeding passage 5 feet 3 inches × 38 feet 6 inches.

The lines of stalls for animals run transversely in the building, and two lines of stalls head to each passage.

The feeding passage, 16 feet in width, under the driveway, would be unnecessarily wide for the purpose of a feeding passage alone, but a large portion of it is occupied by a hanging granary of eighteen hundred bushels' capacity, which is suspended to the driveway floor-joist, is filled through trap-doors in the driveway floor, and the grain is drawn out by slides below. Mr. W. claims that the granary, thus suspended, is rat-proof, and that the space required for it costs less in this position than in any other in the building, is more conveniently filled and emptied, and is more conveniently located for feeding from these than elsewhere.

The cellar for storing roots and cooking food for the stock, and the engine-room, if an engine is used, is made by arching vaults in the bank on the north of the basement, to which it opens through the foundation wall. The root-cellar is separated from the engine-room by a wall, as also is the boiler and cooking apparatus from the engine.

The roof of these vaults consists of two arches extending at right angles with the north foundation wall of the building, the base of each arch resting on a party-wall, through which are doorways connecting the vaults.

The vaults are filled and lighted through the arch. The smoke-flue is laid in the ground some one hundred feet from the north end of the boiler-vault, where it connects with a vertical smoke-stack, thus providing thorough protection from fire. This position for the root-vault is a very convenient one for storing away the roots, as the trap-doors in the arch may be reached by the carts in open grounds, and the roots be dumped on screens, by which they are assorted, and all loose earth removed. The door opening from the basement to the root-cellar is at the north end of the wide feeding passage, and that opening to engine and boiler-room is in north wall of wagon-house. The wagon-house is in west end of basement, and the horse-stable adjoins it, so that the horses may be taken to and from the wagon-house from stable without going out of doors.

The floors of all the basement, except a small portion of the stall-floors, and the floors of the vaults, are made of concrete of broken stones, gravel, sand, coal-tar and pitch, making them hard, smooth, dry, rat-proof, and, with all, antiseptic.

The floors of basement and vaults are all on the same level. No hay in a natural state is thrown down into the stable for feeding, but is all placed in the rack from the main driveway floor, and from another hay-feeding passage under the mow, and directly over two lines of cattle. Mr. W. claims great economy and cleanliness by this hay-feeding arrangement.

The fodder cut is cut on the driveway floor, from which it falls into one or more of the hanging bins of granary, from which it is conveniently drawn out for feeding.

In the absence of steam-power, or in conjunction with it, if both are supplied, which Mr. W. recommends for use at the State farm, the horse-power provided for is a two-horse endless chain, to be placed on the principal driveway floor, where all threshing, corn-shelling, fodder-cutting, &c., is to be done. The corn-crib is located against the south side of the barn; the floor of crib and driveway on the same level. The crib extends from the west end of the building towards the east, until it laps six feet on the driveway, where they connect by doors, one above another, for convenience in filling the crib from the driveway, where corn may be husked and assorted. The partition between the mow and crib is rat-proofed, and all the walls of the crib are close, except a ventilation near the roof in each end, and the floor, which is latticed. The crib is supported in the frame of the barn, so that no supports extend to the ground. The entire front of the stables above, 2 feet 6 inches above the floor, consists of windows extending to the ceiling, that the full effect of the sun may be secured. The windows consist of a single sash, hinged to the head of the frames, that they may be hooked up to the ceiling in summer, thus opening the entire front.

About 3 feet in width of the rear portion of the cattle-stable floor is a cast-iron lattice, covering a concealed gutter. The urine, and most of the solid excrement, fall directly through the lattice-floor, and the balance of the excrement is trodden through into the gutter, or may be very readily swept through with a brush-broom. By this arrangement, Mr. W. claims that the animals are more cleanly and more comfortable than he has ever been able to effect by any other. The urine drains from the concealed gutter through glazed terra-cotta pipes, laid below frost across the barnyard to the manure-house. The gutter under the latticed portion of the floor is so arranged that it is very conveniently cleaned. It is shovelled into a barrow, or truck, and taken across the yard and dumped down into the manure-house, the floor of which is 6 feet below the grade of the yard.

The central portion of the horse-stalls, 2 feet × 2 feet 6 inches, is also a cast-iron lattice, which lies on a frame so set in the concrete floor that all the urine drains into the sink, formed by the frame, and a cement bottom on the earth.

These sinks are connected by pipes, and the urine discharged from one to another, and finally, from that nearest the south wall, it is taken in the ground across the yard to the manure-house. The urine-pipes discharge from the face of the wall of the manure-house some three feet above its floor, and the urine is all absorbed by the bedding and excrement. No rain-water is admitted to the manure in the house. It is located along the south bank-wall of the yard. A plate rests on this wall, and the posts supporting the ridge of the single pitch, or lean-to roof, stand on it. The space from post to post, opening to yard, is closed by suitable lattice-gates, giving access to the entire length of the house, for dumping in the manure.

The eaves of the roof are supported on a plate resting on posts set firmly in the ground, which are closed only by a movable plank.

The road for vehicles, by which the manure is to be removed, is some two feet below the puddled clay floor of the manure-house, for convenience in loading. The accommodations for swine and sheep are provided by extending the bank-wall on which the north side of the barn rests, to the west, and in a direct line with the barn, a sufficient distance to provide shelter for the sheep next to the wagon-house, and the swine adjoining on the west; the apartments to be separated by a close partition. A portion of the roof near the eaves, and also of the front of the sties and fold, is to be glazed to secure warmth from the sun in winter. An arched vault is to be made on the north of the sties, entered through the wall, in which the food of the swine is to be kept and cooked.

A steam-pipe is to be laid in the ground from the steam-generator in the vault previously described, to the food-vault for swine, by which the food is cooked.

The dairy should be so located that the refuse of it will flow, in pipes laid in the ground, to the vault for swine.

The ridge of the roof of these two apartments is to be raised above the bank-wall some five feet, and one-half of this space arranged to be opened when required for cooking and ventilating.

The fold is reached from the basement of the barn through the wagon-house, and the hay is supplied to the fold by a shute from the mow over the wagon-house. The sties and fold have their respective yards extending down to the manure-house, and the excrement from all the animals is to be mixed in it. All the apartments for animals are to be supplied with air in winter by an *air-duct, laid below frost in the ground*, some 200 feet in length. The duct is to ascend from the point where it receives the air to where it discharges it, through the floor of the feeding-passages in front of the animals. He claims that the air in the duct will absorb heat from the earth, and as it becomes rarified, will rise into the stable, &c., whence it is to be removed by vertical shafts opening at the ceiling of the stable and extending to the roof, where it escapes by a common, spacious egress formed in the cupola on the crest of the roof. The air being admitted at the floor in front of the animals, and escaping at the ceiling behind them, places their heads in a direct line between the ingress and egress, and the excrement directly under the latter, thus effectually providing for the most wholesome and effectual change of the air, without a perceptible draft or current. Mr. W. stated that several years' experience with this mode of supplying air to stables had established the fact that the air may be supplied to a stable otherwise close, above the freezing point when the external temperature is eight degrees below zero, and great economy and comfort secured.

The hay is put into the mows by means of a power-fork, by unloading both right and left from the driveway floor, and by so arranging the grade at the east end of the building that vehicles loaded with hay may be unloaded by the power-fork through large, high doors in the gable.

He recommends that there should be no sheds on either flank of the yard, as they exclude the sun when it is near the horizon, but that it should be inclosed on the east and west by a close board fence eight feet in height.

He says that the yard should not be used for manufacturing manure, but should be paved with good surface drainage to each corner, and should be used only for sunning and exercising the stock; their dropping to be daily gathered up and placed in the manure-house. No straw or stalks to be strewed in the yard, nor any arrangements for feeding in the yard provided. All food to be eaten in the stalls. If flowing water is obtainable, he recommends to have it flow first into a tank or tub in the root-vault, thence, by its overflow, to a tub in the centre of the yard, taking its overflow in the ground out of the yard.

Mr. W. stated that three years' experience with a *manure-cellar*, *under a stable and barn*, satisfied him that this was a very objectionable arrangement, and that he has never arranged but one barn thus in his practice of twenty-five years, and that he declines making plans for a building to be thus arranged, even if it be erected under his protest.

EVENING.

The evening session was held in Palmer Hall, commencing at 7 o'clock.

President CLARK called the meeting to order, and Colonel MARSHALL P. WILDER, of Dorchester, was elected chairman for the evening. On taking his position upon the platform, he addressed the audience as follows: —

Ladies and Gentlemen,—It affords me great pleasure to be here this evening, and to take a part in the proceedings. I have long been a cultivator of fruit; I have long desired to make it so common that every man, woman and child of our country should enjoy these choice blessings of Heaven. I am, therefore, very willing to accept the courtesy which is tendered me this evening, of occupying the chair, and to aid, with such ability as I have, in carrying forward the objects of the meeting.

I have now great pleasure in introducing to you my dear friend and associate, with whom I have labored for many years, the highly distinguished President of the Massachusetts Horticultural Society, an institution which is not surpassed in ability by any on this continent, and I believe I may say, from the experience of the past year in travelling abroad, that it is not surpassed in character, ability and usefulness by any similar institution in foreign lands. I beg to introduce to you Mr. JAMES F. C. HYDE, who is not only able to preach, but, to my personal knowledge, has practised what he will preach to you.

ADDRESS OF J. F. C. HYDE, Esq.

The subject of which we shall venture to speak to-night, is one on which volumes have been written by the ablest horticulturists of the land—one that is now attracting the attention of thousands throughout the country, from the State that first greets the rising sun on the east, to the young and flourishing state on the far-off shores of the Pacific. Within the recollection of those in mature life, there were but few varieties of apples, and fewer of pears, with some peaches, while little or no attention was paid to the cultivation of strawberries, grapes, raspberries, blackberries and other small fruits.

The Roxbury Russet, Seaver Sweet, Porter, and later the Baldwin, were the prominent apples, while the Orange, St. Michael and St. Germain, were the leading pears. We well remember that thirty years ago the demand for such fruit as was then raised was quite limited, except, possibly, for apples, and those sold at low prices.

But what a change has taken place! To-day, as we look over a vast country north, east, south or west, we see large and flourishing orchards of apple, pear, peach and cherry, besides thousands if not millions of acres devoted to the growing of the small fruits.

Once, the fruit-growers relied solely on the home market, and transported their fruit in wagons from the orchard or field to the village or city within a convenient distance; now, with the new and improved methods of packing and transportation, the product of the gardens and orchards in Delaware, Virginia or Ohio, are placed in the market-houses of Boston in a short space of time, and in good condition. Instead of the market wagon only, we see huge engines also, whirling along over the iron bands that bind one section of country to another, dragging whole trains, laden with the choicest fruits of the pleasant hillsides and valleys of the Middle States, the rich prairies of the West, and of almost every portion of the country, from the stormy Atlantic to the vine-clad shores and islands of the great lakes. A change has come over all.

The producers have increased, and the consumers have increased in an equal ratio. The more fruit produced, the greater the demand. Fine fruit always brings a good price, if it reaches the market in good condition. The predictions of those who declared that the market would be glutted have never been, and we believe never will be, verified. This vast country with its active millions will, if they can get it at fair prices, consume enormous quautities of fruit. *Once*, a nursery boasting of ten or twenty acres, was considered a large and important one; now, we find nurseries that actually contain three, four, and even five *hundred* acres each. Where dozens of trees were sold, as many hundreds are as easily disposed of, and great efforts are yearly made to meet the immense demand.

Around all our cities hundreds of fine gardens may be found, from which are annually gathered fruit for the family of the owner, with a surplus to sell to those who are less fortunate. Fruit has become a part of the regular diet of many families, it being found, on experience, agreeable, healthful, and at the same time economical, as it saves other food and doctor's bills. If, then, this matter of fruit culture is one of so much importance, it may not be amiss for us to devote a brief hour to its consideration.

The soil and climate of good old Massachusetts may not be so well adapted to some branches of fruit growing as many other locations; yet what nature has failed to do for us, we have undertaken, with pretty good success, to do for ourselves; or, in other words, the live, energetic Yankee, has a great faculty for overcoming obstacles. What will not successfully withstand our climate out of doors, is carefully placed in well glazed houses, artificially heated, where even the richest fruits of the tropics are made to flourish. While such structures may not always pay in dollars and cents, they are a great source of satisfaction to the owner, as well as to many others. But our aim is, to discuss, at the present time, the hardy fruits, such as we all can raise, by ordinary skill and enterprise.

Among the most useful of all our fruits stands the apple. It does seem too bad that Massachusetts should be obliged to pay thousands of dollars annually to other States for apples, when we have, perhaps, thousands of acres well adapted to the cultivation of this fruit. It is doubtful if apples can be raised near the large cities, where land is worth a high price, and pay as well as the smaller fruits. But back in the country, where good land suitable for orchards can be obtained for fifty or one hundred dollars per acre, convenient to railroads and other means of transportation, this fruit can be profitably raised.

If the farmer in Western New York can grow this fruit to a profit *five hundred miles* from the market, cannot *we* do it, who are only fifty or possibly a hundred miles away? Complaint, in years past, has been made, that when the crop was abundant, prices ruled low; but this has not been true for the last few years, and we predict will not be again for a long time to come. In proof of which, we refer to the prices obtained this year, when the fruit crop throughout the State is nearly up to the average—three to five dollars a barrel for apples, twenty to thirty cents a gallon for cider, have been the rates demanded in the cities. Surely these are remunerative prices! But suppose, in years of great plenty, prices should rule low, is it not so with every crop? Shall we cease to grow wheat or corn because, in some seasons, the prices fail to meet our expectations?

The apple can be used in so many ways that it has become indispensable in every household. No fruit enters so much into cookery as this, while it is generally relished in a raw state. Some of us may prefer for the dessert a melting Seckel, Doyenné du Comice, or Dana's Hovey pear, but would not wish to dispense with the apple for pies, puddings, sauces, jelly, &c., to which we are so accustomed.

No portion of this crop is lost, for the apples that are too poor for other uses may be made into cider, to be drank, if one needs it, or to be used for vinegar. Until within four or five years, this fruit was a certain and regular crop, larger the even years, because the Baldwin, a variety extensively cultivated, bears every second year, and that the even year.

Two or more causes have operated to prevent a crop of apples; the first being the canker-worm, which has been very destructive in some localities, and the excessive drouths of 1865 and 1866, if we remember correctly. We declared it our belief, at the annual meeting of the State Board of Agriculture held at Concord, that there would be a good crop of apples this year; and we see no reason why this may not hold good in years to come, with slightly varying results.

Certain things are requisite, even in the cultivation of apples, in order to secure the best results. The soil and location selected for the apple orchard must be such as will be adapted to the growth of the tree and the production of fruit. We regard what is called strong land, even though a little stony, as the best for an apple orchard. A good deep, yellow loam for a subsoil is excellent. If the land is inclined to be wet, it should be well drained. Avoid thin *plain land;* but on no account set apple-trees on wet meadow land. If the location be on the south-eastern, southern, or south-western slope of the hill, so much the better, that the trees may enjoy some protection from the cold, sweeping winds of the winter, which are very trying to trees, especially since the forests have been so extensively cut off. We regard this matter of shelter as one of great importance, not only as applied to this fruit, but more especially as applied to pear and other less hardy fruit trees. Having secured a proper location and soil, it is better to cultivate the ground at least one year, and manure it well, before setting the trees. Select, as the best age and size, trees two or three years old; head them in slightly, by cutting off a portion of the former year's growth. The ends of all the large roots should be smoothly cut off before the trees are set out. The trees may be set to good advantage in the fall, if the ground is not too wet and springy, though many prefer spring. We have had equally good success in the former season. When once planted they should not be neglected, as thousands of trees are, and left to die. Many persons buy a few apple-trees, set them out in the grass, and then go away trying to think they own an orchard.

A very few years undeceives them. Trees, like field-crops, require and must have almost constant care. We have noticed in the back towns of some of our neighboring States, they let the trees grow where they happen to spring up; or if they planted an orchard, they allowed the grass to grow among the trees, the branches to die and remain until the winds blew them out; in short, the owner only gathering the fruit, leaving all the rest to nature. This is a very bad way, and should not be tolerated. In this, and in all other matters, "what is worth doing at all is worth doing well." In the selection of varieties care should be used. If for home use alone, it should be the object to plant so as to enjoy a constant succession of fruit from the first of August to the next spring or summer. This will require a larger number of varieties than one would care to grow for market purposes. One great mistake that has been made by those who raise fruit for the market is the planting of too many sorts. This remark will apply with greater force to pear-growing. On nearly every farm or garden can be found land that will raise apples, though not all equally well. If one's garden is quite limited, and a few apples are desired, we advise the planting of dwarf trees, which, with good care, will yield a fair quantity of very superior fruit. If we were asked to name twelve varieties for home use, we should give the Red Astrachan, Early Sweet Bough and Williams, for summer; the Gravenstein, the Pumpkin Sweeting, for baking, and Porter for fall; the Baldwin, Rhode Island Greening, Roxbury Russet, Golden Russet, Hubbardston Nonsuch and Ladies' Sweeting, for winter. For market purposes, the Williams, if a summer variety is desired,—an apple which, if properly grown, is one of the most profitable sorts raised,—Dutch Codlin, which always sells well for cooking; the Gravenstein, Hubbardston Nonsuch, Rhode Island Greening,—a most excellent apple for culinary purposes,—Baldwin, and for late keeping, the Roxbury Russet, which, though not a great, yet is a regular bearer.

Apple-trees should receive attention every year. They need to be pruned; to be protected against the ravages of insects—canker-worms, caterpillars, and borers; to be scraped when they become rough barked, that no harbor may remain for injurious insects, and also to improve their appearance; to be manured, if they need it, to keep them in good growing condition.

There is some difference of opinion among orchardists as to the distance apart which apple-trees should be planted, and as to whether the lower limbs should be allowed to remain as a protection to the body of the tree. We have always advised planting about thirty feet apart each way; but some plant them, with good results, at twenty-five feet. We would not allow the limbs to touch or lie on the ground, but would take them off, from time to time, at the proper season of the year. We do not believe in excessive pruning at any season, or pruning at all in the late winter or early spring—a season most recommended by many writers on the subject. Our own experience fully justifies us in saying that of all seasons of the year *June* is the best. And we prune our trees, if possible, during that month; but any time between the last of May and the first of October is far preferable to pruning in March. Many orchards have been nearly ruined, and the lives of the trees shortened, by the cutting off of large limbs in early spring, allowing the sap to flow down, the wound to canker and induce decay. The Hubbardston Nonsuch is one of those sure to be injured, if pruned at such a time.

We cannot dismiss this subject without a few remarks concerning the picking and packing of fruit; for after it has been raised it is of the highest importance that it should be carefully gathered, properly assorted, and so sent to market as to command the very highest price. We would apply this remark to all fruits alike, whether large or small. Too often good fruit is nearly ruined by improper picking and packing, either for home use or market. When apples are to be sent long distances they should always be placed in clean, strong barrels, and pressed or screwed down so that no amount of shaking will cause them to settle and become loose in the barrel.

A word as to the keeping of winter apples, and we leave the subject. Keep them cool and dry—just as cold as possible without freezing them, and as dry as possible without shrivelling them. A barn-cellar, secure from frost, is the best place to keep apples. Next in importance to the apple, in Massachusetts, comes the pear, though we have been surprised to find that most of the pears grown in the State are raised in the vicinity of the cities. One of the reasons that has heretofore operated to prevent the general cultivation of this fruit is the impression that has prevailed extensively that the pear is a long time coming into bearing, and that all who planted them were planting for the next generation rather than this. The trees have been more expensive than other fruit trees, and some of them have been destroyed by blight and winter killing. The first objection is comparatively groundless, for, with the dwarf pear-trees, one may reasonably expect a fair crop of fruit the fourth or fifth year from the time it is budded on the quince, while if the trees be on their *own* roots, twelve to fifteen years will elapse before any considerable results will be obtained. But what is this? He who plants must plant in faith. We well remember when, some years ago, we were gathering seed of the elm under a large tree belonging to a neighbor, that a gentleman asked us what we were doing; and when told we were securing a quantity of elm seed for planting, he looked incredulous, and taking up a quantity of seed in his hand which were several hundreds, so small and light are they, said: Do you ever expect to get trees large enough to sell from that stuff? When we assured him that we expected to live to see trees from that seed, or if *we* did not, somebody else would, he shook his head and passed on. To-day we can show many fine elms raised from that seed, standing in the streets of Newton, that are considerably more than a foot in diameter, spreading wide their graceful branches, affording an agreeable shade to the passer-by.

You all remember the story of the old man who would not plant an orchard because *he* would not live to enjoy its fruits. But his *son* planted one, the fruits of which both he and the old man enjoyed. He is a very selfish man who declines to plant pear or any other trees, because he may not live to reap the full benefit. If he be a benefactor who makes two blades of grass grow where but one grew before, what shall be said of him who plants trees from which shall be gathered golden fruit in bounteous measure to gladden the eye and gratify the taste?

Think of the great progress that has been made in securing varieties of every season, size, color and flavor! We are no longer confined to three or three hundred, or, we might say, a thousand sorts. Those who do not enjoy the sweet and cloying Seckel, may grow the Beurré Superfin. If the musky flavor of the Bartlett does not suit the acute palate, then take the Clapp's Favorite, where that unpleasant flavor is wholly left out.

If you wish a fine almond flavor, plant the Abbott; if the decided taste of cinnamon, then secure the Mt. Vernon; or if you are inclined to the rose-water, turn to the Urbaniste, and so we could go on through a long list.

What more pleasant to the eye than trees bending beneath their load of fruit, touched with golden, red or russet hues such as no artist's hand can reach?—rich as the choicest fruits of Eden, fruits fit for the gods. The tropics boast their cooling fruits which nature gives in wonderful profusion, but none more pleasant than those *we* gather beneath these northern skies. If these things add so much to our enjoyment, then let us have them in abundance, as we may. It is not alone the satisfaction of *eating* the pears, but the still higher one of raising them, of studying the varying forms, color and peculiarities of each variety, the habits of the trees, time of ripening, and many other things that go to make an orchard a school, where many lessons may be learned. The more we study nature, in whatever form presented, the more the love of it grows upon us.

The time was when it was thought difficult to raise pears, but latterly they have been as sure a crop as that of apples, and we believe they can be raised and sold at a much less price than they are now selling for, and pay a profit. Greater care should be exercised in the selection of a site for a pear orchard than is needed for the apple. The trees seem to flourish well on a heavy soil, whether of clay or loam, but all lands devoted to pear culture should be well drained and thoroughly trenched or ploughed. We regard trenching as the best, but it is expensive work to do. Deep ploughing answers a very good purpose, and does not cost one-tenth as much; yet it will be found, in ten years, that the difference is greatly in favor of those trees set on the trenched land.

When the land is so treated, it needs to be heavily dressed, especially where dwarf trees are to be planted. Our rule is to keep the trees growing vigorously until they have attained considerable size and commenced bearing.

We should prefer to plant mostly standard trees, for they will live longer, and give, in the long run, better results. Trees two or three years old from the bud or graft are the most to be preferred, though we have transplanted them twenty-five feet in height, and had them do very well, and give a fair crop of fruit the second year after being set. Eight years ago we set out several hundred trees that were five to seven years old, and from seven to twelve feet high, and we believe to-day that there are few orchards in the State, which have been set so short a time, that appear so well. From these trees we have gathered much fruit during the past four years. It is not so well sheltered as we would *choose* to have it, for we regard this as of very great advantage to a pear orchard. We have planted a thick row of evergreen trees all along the north and east side, to break off the cold winds of winter, so hard upon the trees, or the force of the autumn gales, so destructive to fruit.

In the selection of varieties, as wide a range of flavors as possible should be secured, and a succession of fruit, from the earliest to the latest. In order to secure this result, it will be best to plant from fifteen to twenty varieties; though, of the very *early* varieties, a single tree of each will be sufficient. The Madaleine, though not first-rate, is yet very early. Rostiezer, a very fine pear, but not large or showy enough for market. Brandywine, a sweet and excellent pear. Beurre Giffard, Clapp's Favorite, which is a very valuable variety, but like all early pears, needs to be picked even before it appears to be ripe. These for the summer. The Bartlett, the universal favorite; Belle Lucrative, a sweet, delicious pear, but not profitable for market, because it lacks color; the Abbott, which, though not large, is very fine, possessing a distinct almond flavor; Paradise of Automne, an acid pear, fair size, very productive; Swan's Orange, a large fine-looking acid pear of good quality; Sheldon, a very highly flavored fruit, of good size—there are few better pears than this; Seckel,—this variety is too well known to need any description,—so far as mere quality is concerned, it stands at the head of all varieties; Marie Louise, a most admirable sort; Urbaniste, which possesses a decided rose-water flavor, few better than this, though the tree is a long time coming into bearing; Beurre Bosc, a noble fruit; Beurré d'Anjou, all things considered, one of the most valuable sorts cultivated, large, good, productive. These are for fall varieties. For winter use we have Dana's Hovey, a variety almost equal in quality to the famous Seckel, and not surpassed in its season by any other; Lawrence, a valuable sort that ripens up well without extra care, it is sweet and melting, and we regard it as among the best; the Vicar of Winkfield is seldom a good eating pear, but is good for cooking. One great difficulty with it is that it overbears, and the growers fail to thin it.

For market purposes and profit merely, we should recommend the planting of not more than six or eight varieties, and those should be Clapp's Favorite, Bartlett, Swan's Orange, Beurré d'Anjou, Doyenné Boussock, and Buffum. If we were to add two more we should select Sheldon and Lawrence. No pears should be allowed to ripen on the tree; many of them, if so left, become worthless, while others are not half as good as though picked and ripened in the house. This does not apply to most fruits; apples, like peaches, should ripen on the tree. Many persons planting pears for profit have made a grand mistake in setting out too many varieties, and those, too, that have not been fully tested for general cultivation. It is all very well —in fact, of the highest importance—that the *pomologist* should *test* them all, but it is far from profitable.

We have often heard pear growers express their regrets that they ever planted over five sorts. Those who have many varieties can graft such as are not valuable with little loss; for scions set in *bearing* trees will produce fruit by the third or fourth year. Many ignorant persons suppose they have only to plant the trees, whether in grass or ploughed land, and in a few years they will have an abundance of fruit; but such are quite likely to find out their mistake. Trees must have constant attention, or they will not flourish. There is a great difference on different soils, but the same law holds good here as everywhere else—if one would secure good results he must work. With all the conditions favorable, it will not be a difficult task to raise the fruit. Care must especially be used in thinning and picking it at the right time, assorting and packing it for market, so that it may yield the largest returns, or, if intended only for home use, that it may possess the very highest qualities that the variety is capable of yielding. When pear orchards are judiciously planted and well cared for, one may reasonably expect the trees to live to a good old age. We know of trees which we have no doubt are more than a century old that are yet giving their annual crops of fruit, while the Bartlett, which is one of the shortest-lived trees, will produce in great abundance for twenty-five or thirty years, and its life is thus short because of its overbearing.

The pear needs little pruning as compared with the apple, and the work should be performed at the same season of the year, namely, June. It is an excellent plan to cut in young and very thrifty trees; that is, shorten back the new growth, because, if the trees are very thrifty, they will sway round and become ill-shapen.

Pear-trees will bear to be planted much nearer than apple; in fact, about double the number should be planted on an acre, if standards; if dwarfs, double the number of standards; the former we plant fifteen by twenty feet, the latter six by ten or ten by ten. The pear-tree has few insect enemies, and in this respect is more highly favored than the apple. We do not believe that fruit culture, whether of pears or other fruit, is so wonderfully profitable in dollars as some writers would have us believe; but we do think fruit culture, under favorable circumstances, is much more profitable than ordinary farm crops.

But we pass from this branch of our subject, to refer to the peach, the most luscious fruit of our northern climate. Years ago, before the yellows made their appearance and the forests were cut off, good crops of this fruit were raised even here.

For the last fifteen or twenty years it has become more difficult to raise the peach. This fruit cannot be relied upon as formerly as a profitable one for the market. We advise all to plant a few trees each year, with the hope that once in three or four years they may raise some peaches. The duration of the life of the tree depends very much on the way it is managed. We have a tree on our place that was one of a lot of which all but this were set out and cultivated highly and died years ago, while this one, planted in grass ground, and only manured so as to keep it in good condition, is now more than twenty years old, with no signs of disease, and has given, some seasons, large crops of fruit.

We believe much depends upon the mode of cultivation. If they are forced into great growth by high manuring, they will, like the cherry-tree, surely die off. Then shelter is of the greatest importance with this fruit. It is said that very cold weather will kill the fruit-buds, and so it will, when they are exposed to the cold winds; but in sheltered places they will withstand a great degree of cold without injury. One year old trees are the best to plant, and they should be cut back one half or more, and so every year the new wood should be shortened in. The tree so treated becomes more compact and symmetrical, and is less liable to be broken down by the winds, ice and snows of winter. They should, when planted in an orchard, be set from ten to twelve feet apart each way. Among the best sorts are the Early and Late Crawford, Early York, Cooledge's Favorite, Grosse Mignonne, Hale's Early and Foster's Seedling. Peaches should always be allowed to ripen on the tree. They are never better than when they are permitted to remain until a slight jar will bring them down—just mellow enough for eating—though it will not do to let them ripen so much when they are to be transported long distances to market.

The cherry next claims our attention, though it does not hold a high rank in this part of the country for market purposes. In our boyhood days the trees gave their fruit in great abundance, for we recollect we made good wages picking them at half a dollar a bushel. A few years ago a severe drouth affected the trees unfavorably, which, added to the black wart that made its appearance in great numbers in some localities, and the tendency to disease, have all combined to bring the raising of this fruit into disrepute. Formerly, cherries sold for three or four dollars a bushel, while two years ago we sold the Black Tartarian for twelve dollars a bushel. The trees of some varieties have behaved badly, bursting the bark and turning black, while some of the branches would die.

We have in mind a cherry orchard of a hundred trees, more than half of which were either killed outright, or very much injured, by excessive manuring, and the remainder were only saved by sowing the land to grass. One of the healthiest and very best cherry orchards we know has been in grass for the last twelve years, and yet has given the very best results. The land is strong and good, but not wet. It may be set down as a sure thing that high manuring will destroy the finer kinds of cherry trees, by causing them to make too great growth. Another drawback to the cultivation of the cherry is the curculio, that destroys a great part of the fruit. Though this fruit, like the plum, is not considered so healthful as some others, yet we hope it will not be abandoned in our State, either for home use or market. Some of the best sorts to grow are the Mayduke, Black Tartarian, Black Heart, Downer and Elton.

The plum is so little raised since the black wart and curculio made their appearance that we will not devote time or space to its consideration.

We pass now to the grape, a fruit that has received the attention of fruit-growers from the time of Noah certainly; and probably Adam plucked the rich clusters ripened beneath the influence of an Eastern atmosphere. It has been a favorite fruit wherever cultivated, not only for table use, but for wine. Few or none of the foreign varieties have ever flourished here, and it was not until the Isabella and Catawba made their appearance that our people took much interest in the cultivation of this fruit, and even then but here and there a vine could be found on our Northern farms. Later the Diana was added to the list, and others of lesser note; but the honor of giving a grape to the country, that was to be extensively cultivated and highly prized from the extreme East to the extreme West, was reserved for one of our own citizens; and when Mr. Bull sent out his Concord grape he conferred a great boon upon the country. Immediately new seedlings were announced in every direction, each claiming to possess superior merit. In this connection we should not forget Mr. Rogers, Dr. Grant and others.

All this had the effect to call the attention of the public to the importance of this branch of horticulture, and to-day we look abroad and behold hundreds of thousands of acres devoted to vineyards. Volumes have been written in favor of grape-growing, grape-growers' societies formed, conventions held, addresses delivered, premiums offered, vines raised by millions, and sold at low prices; in short, nothing has been left undone to stimulate and encourage the planting of the vine. The Eastern markets that were formerly supplied only with limited quantities of this fruit, late in the season, now receive nice Delawares or Hartford Prolifics by the middle of August, from the South, to be followed by immense quantities from the Western and Middle States, to supply the market until Christmas, or past. Lands in some parts of the State of New York, and along the shores of the lakes, that a few years ago were of little value, now command high prices; and it is claimed that good grapes can be raised for four cents a pound, and prove as profitable as any other crop. While it may possibly be done in certain locations more favorable for the growth and maturity of grapes than ours, certain we are, from our experience of the past five years, that there has been little or no margin for profit. Such vast quantities of this fruit are now raised that it would be impossible to find a market for it while fresh, and the larger portion, perhaps, is used for wine. Ohio was the pioneer State in this branch; but California now claims the foremost rank, while Missouri and other of the States produce large quantities. Without doubt this country is destined to become the greatest wine-producing country of the world, and may yet supply this article to countries from which we have been and are now importing large quantities. Forty millions of consumers will dispose of a large amount of this fruit if they can secure it at low prices, preferring to take the pure juice of the grape in the original packages, rather than to take it from the bottles after fermentation. Even Massachusetts has many acres devoted to grape-growing, though not so much with a view to wine-making as for market purposes. Many persons were, a few years ago, quite enthusiastic over the prospect, believing grapes to be the most profitable fruit-crop that could be raised. We were not among that number, but were willing to try the experiment. Others have done the same, perhaps, on a larger scale, with similar, or, we hope, with better results. A great deal depends upon soil, location and treatment.

A southern slope, with good shelter or protection on the north-west, north and north-east, is of the highest importance in this cold climate of ours. The very finest Concord grapes we ever saw were raised in Waltham, beside ledges of rocks where they had the benefit, not only of shelter from cold winds, but the direct and reflected heat by day, and the warmth evolved from the rocks at night. Few persons who have not tried the experiment have any just idea of the advantages to be derived in this climate from planting grapes beside rocks where the vines can have "*warm feet.*" A rather dry, gravelly loam or clayey soil we find to be best adapted to the grape. Avoid a deep, rich, mellow loam, such as is usually found in hollows. Sandy lands are not the most favorable; open plains are not good. Use but little manure, and that little well decomposed, or ashes or bone-dust. We have raised the best fruit on the poorest soil. Trenching the soil is not necessary; deep ploughing is sufficient, because grape-roots do not extend deeply. Strong one-year-old vines are as good as any; but we do not object to those two years old. We prefer to set them in the spring. In regard to training, there is a great difference of opinion even among old grape-growers. We have had good success with certain kinds by spiral training to a single stake, and the spur style of pruning. We have tried wire and wooden trellises, and find that they answer a good purpose. The renewal system has its advantages. Something depends upon the habit of the vine. Most of the Rogers numbers are rampant, and will not bear cramping. We have never been able to get good bunches from No. 15 when trained spirally, while the little Delaware will give good crops with such treatment. Some of the largest crops of grapes we have ever seen were raised in trees, the vine left pretty much to itself. And we are told that this plan is extensively practised in Italy. When so trained, they seem to be almost wholly exempt from the ravages of mildew, the great obstacle to successful grape-growing. They generally ripen earlier in the trees for this reason. The vines should not be set nearer than eight feet apart each way. Many of ours are only six, and we find they are crowded when in foliage. If set to stakes, the cultivator can be run both ways, saving much expense in the care of the grounds. We do not believe in deep tillage in the vineyard. Mildew should be carefully watched, and prevented, if possible. Prune always in November, if possible, and lay down the vines, unless they are very hardy, like the Concord. Always avoid severe summer pruning, which has a tendency to suddenly check the growth of the vine, and induce disease. If the fruit is sent to market, it should be placed in rather small packages, and well packed.

Having spoken thus freely of grape-growing, some are ready to ask what varieties shall we plant?—a question that we have had asked many scores, if not hundreds of times, and one, too, that is difficult to answer to the satisfaction of all. Many now before me will doubtless differ with me, and give a somewhat different list. We speak both from a somewhat extensive experience and close observation in this section of country. First and foremost, all things considered, we place the Concord, not that it is of the highest quality, for, as we get it in Massachusetts, it is never first-rate, nor does it keep well; the skin is very thin, and breaks in the handling, which soon results in decay. The fruit of this variety unfortunately soon loses its pleasant flavor after being picked, so that, at the end of two weeks, it is hardly fit for eating. It is hardy, notwithstanding our coldest winters, healthy, generally free from mildew, though liable to rot among the berries. It is a good grower and great bearer. It generally ripens, it is of large size, both in berry and bunch, of dark color, and therefore very attractive, and finds a ready sale. The Hartford Prolific is an early grape, ripening about a week or ten days before the Concord, smaller bunches, not of so good quality, drops from the bunch, which is a great objection when the fruit is intended for the market, not so hardy as the former, but a great bearer. We need something as early, of better quality, to take its place. The Delaware is a nice little grape for home use, not profitable to grow for market, for it will bring little more than the Concord, and it will cost twice as much to raise it. It is quite liable to mildew and lose its leaves, and when it does so, fails to ripen its fruit. The Diana is a most excellent grape, of a peculiar flavor, but it does not bear well enough, and is quite liable to rot. The only way to get fruit of this variety is to put it on very poor land, and give it no dressing. The Creveling is a grape of excellent quality, but has serious faults—a very loose bunch, and a great liability to mildew. We cannot advise the planting of it. Rogers No. 4 is a large, noble black grape, resembling very much one of its parents, the Black Hamburg. When it fully ripens, which requires a long season and a favorable location, it is very good, perhaps the very best of the Rogers; but Nos. 3, 9, 15, 19, 41 and 43 are also good. The first three are red varieties, the last three black. In a majority of seasons they will ripen and give satisfaction. The Israella ripens its fruit early enough when it does not suffer from mildew, to which it is very liable. We have never yet obtained a fair crop from it for this reason. It is only of fair quality when you get it. The Iona, though a grape of the very highest quality when well ripened, is of no value for vineyard purposes in Massachusetts. In very favorable situations it will often mature its fruit. The Adirondac is of the Isabella class, and no great improvement except in the time of ripening, it being early. Its foliage mildews badly, and the vine needs to be covered in winter. Only fit for amateur cultivators.

We have given a brief notice of a few of the more prominent among the many sorts we have cultivated, with the feeling that we have not yet seen just the grape we want for a New England climate. It remains for some fortunate individual to give us a variety that shall prove as hardy as the Concord, as good in quality as the Iona, large and handsome as a well-ripened Rogers No. 4; that will resist mildew of foliage and rot of fruit, and will ripen a week or ten days earlier than the Hartford. Do we expect too much? We think not, in view of the progress that has been made within the last twenty years. Though we have given a somewhat discouraging view of grape-growing, still we say to all who have a home, who own a rod or yard of ground, to plant a grape-vine, and do the best he can with it, and he will get good ripe grapes possibly three years out of five. With the new varieties that we hear about, and that are being offered for sale, it is possible that he may be able to do even better than that. Plant only the best, then take the best care of them. We feel certain that we have spoken on this subject many things that some of our auditors will not fully indorse, but we have spoken only that which we think we know.

We must pass to the consideration of those fruits which, though termed small, are yet of great importance to our comfort and happiness. Among the most important of them is the strawberry, which was scarcely known thirty-five years ago outside of a few gardens near the larger cities. The Old Wood and Early Virginia were the only sorts we remember to have seen in our boyhood, until our friend Hovey startled us by the announcement of his new seedling, afterwards called Hovey's Seedling. At that time the demand for this fruit was very limited, and a few hundred boxes would glut the market. Compare that time with the present, when thousands of acres in our own State are devoted to this crop, while carload after carload is purchased of our neighbors in Virginia, New Jersey and New York. And notwithstanding this immense inflowing, good strawberries, for the last four or five years, have averaged over twenty cents a quart, and, with some growers, nearly thirty. And is it any wonder that there is such a demand? For, what can be more agreeable to the taste, in the warm days of June, than nice, freshly picked strawberries, smothered in Jersey cream, or Ayrshire, if it suits any of my hearers better, with plenty of sugar, if one prefers it? A rich, delicious and healthful fruit, and easily grown; yet there are thousands of farmers' families, we fear, within our borders, who, though they have land enough and to spare, seldom or never have this fruit upon their tables for themselves and their friends.

We have written much and strongly on this subject, and shall continue to do so, until we see more attention paid to the cultivation of this fruit; for we do believe it can and should be afforded to the consumer for a less price, and that those who do not raise it for home consumption *should* do so. It is perfectly easy to do it, for it is almost a sure crop. They like a good, rich soil, not too low or wet, well prepared by deep ploughing and very heavy manuring. We have seen as much as six hundred dollars' worth of dressing applied to an acre of strawberries. Set the plants in the spring in rows four to five feet apart, the plants four to five inches apart in the row. Some varieties that make few runners will do nearer, while those that run freely will need more space than we have allowed. Set the plants about one and a half or two inches deep. Never set where water will stand, else during the first winter all may be destroyed. Most of the work of keeping the beds clean the first season may be done with the cultivator and hoe, certainly until towards the close of the season. Be sure and keep them free of weeds. When winter comes on, cover with strawy horse manure, hay, straw, or something of the sort that will protect them. The next spring, cut out paths, if the ground is covered with the vines, which plants may be used for new plantations. Weed them out well before the plants bloom, and then look for a good crop. If the season be at all favorable, a large crop will be realized—from three to six thousand quarts to the acre. The income from an acre may be from ten to fifteen hundred dollars. The crop gathered, plough under the vines, and plant the land to cabbages or other crops that will mature before winter. It will not pay to raise more than one crop of this fruit from the same plantation, and very few good cultivators attempt it. What varieties shall we plant? will now be the question. Among so many on the list, how shall we know which are best? We begin with the Hovey's Seedling, a most excellent variety, that has stood peerless more than thirty years—large, handsome and of excellent quality. Being a pistillate, it is important to plant some variety near it, say three or four rows of the Hovey, and one of some other variety better supplied with pollen. It is better to set the rows running from north to south, that our prevailing west winds may carry the pollen over the whole bed. With such treatment, the best growers have obtained great results. This variety is excellent for family use or market.

The Boston Pine, produced also by Mr. Hovey, is a high flavored variety, good for home use, but not suitable for market, as the fruit loses its color after being picked.

The Brighton Pine is a very valuable sort that anybody can raise who will take the trouble to plant it. A good grower, a good bearer, of good-sized fruit, of good quality, hardy and sure.

The Wilson is now the strawberry for the million—we mean the million who raise fruit to sell—for it is a very great bearer of large fruit. It is hardy, fruit firm, bears transportation well, and will probably yield more quarts of berries than any other variety known. It is not a strawberry of the highest quality, and yet many like it because of its acid flavor.

Triomphe de Gand, if grown at all, should be grown in hills. A good fruit, but not a large bearer. Plant it sparingly. La Constante is a large and magnificent fruit, but fit only for amateur cultivators. The Jenny Lind is a good early strawberry, but not a great bearer. We regard the Hovey, Brighton Pine and Wilson as the most valuable varieties now under cultivation with us. But we cannot pass from this subject without calling particular attention to a new strawberry, which, if we mistake not, is destined to prove a very great acquisition, raised by our esteemed friend Hon. M. P. Wilder, and named by the Massachusetts Horticultural Society, "President Wilder," in honor of its originator. For years we have been looking for a fruit that would surpass the Hovey, and we think this variety is bound to do so. In short, it seems to possess all the qualities one could possibly desire in this fruit. My friends, if any of you who own land are without a strawberry bed, take my advice and set one next spring.

We must not forget the other small fruits, for each is important in its season. The raspberry is a fruit that immediately follows the strawberry, the cultivation of which has been somewhat neglected of late years. It is not a difficult fruit to grow, easier, if possible, than the strawberry, requiring less hand work, for more can be done in keeping the plantation clean by horse power. The flavor of this fruit is very agreeable to all, and it commands a ready sale. The red varieties are the best, and they require to be laid down in the winter to insure a crop. A rich, strong soil is best adapted to their culture. They are usually grown in hills or stools, planted some four or five feet apart each way. They should be planted in the spring on land well prepared. When planted, the canes should be cut down to the surface, otherwise they may fruit the first year, and exhaust the plant so that no new shoots will be developed for the next year. Once planted, they will last for several years, if properly cared for. There are several of the black varieties which are extensively cultivated in some of the States, but the varieties most seen in our markets are the Franconia and Knevett's Giant. The Clarke is a new and very promising sort, and one well worthy a trial. It is a strong grower, and said to be quite hardy. A good crop of this fruit will prove as profitable as the strawberry. The raspberry is succeeded by the currant, gooseberry and blackberry. The former is an excellent fruit, and a very healthful one. We find on almost every homestead in the land a few currant bushes, though generally of the old discarded varieties. During the sultry days of August, when one's appetite fails for the ordinary articles of food, the currant, with its peculiar acid, toned down by plenty of sugar, becomes very agreeable to the palate. It is valuable, because it can be used in so many ways, and it lasts so long on the bushes. No fruit will give better returns for the labor bestowed on its cultivation. A plantation once properly made is good for ten or fifteen years, and we have known bushes to bear well for more than twenty years. New plants can be raised so easily from cuttings that it would be better to reset the ground, or rather select a new field on which to plant them, as often as once in ten years. The old Red Dutch has always been a favorite sort, but of late years La Versaillaise, Cherry, Fertile of Angers and some others have taken the lead among the red varieties, while the Dana's Transparent and White Grape are regarded as the most valuable among the white sorts. The largest and best white variety we have ever cultivated is the Dana's Transparent, to which we have just referred—a variety which was raised by Francis Dana, of Roxbury. We have found none better in quality than our old favorites the Red and White Dutch, but the larger varieties command a better price and a more ready sale in the market. The currant delights in a deep, rich, heavy soil and clean culture. How often do we see the grass growing among the currants, which are put away into some neglected nook or corner, while they deserve better treatment. It is a good plan to mulch them, for the bushes are often unfavorably affected by dry weather. The gooseberry shall receive but a passing notice, though it deserves a higher place on the list of summer fruits than we Americans have ever been inclined to give it. One reason why, is because the larger and finer foreign varieties have never succeeded well in this country, and until somewhat recently there were no American sorts of merit. Now we have the Houghton's Seedling, which, though small, is good. The Mountain Seedling, a larger variety, but of poorer quality. The Downing, a large and fine white variety, which we regard as the best sort in successful cultivation. When we come to appreciate gooseberries as our English cousins do, we shall make greater efforts to secure new and improved sorts. The blackberry is entitled to consideration here, though we believe its cultivation on the whole has never been very profitable in Massachusetts. It is a very rich and delicious fruit, and one admired by all. Until within a few years the pastures and mountain-sides were relied upon to furnish this fruit; but when the Dorchester was introduced, and later the Lawton, plantations of blackberries were made by the acre, and the markets were supplied to some extent with finer specimens of this fruit than had ever greeted our eyes before. Since that time we have had many new varieties added to the list, among which are some that will prove valuable. The Kittatinny and Wilson's Early are among the number. Still later we have received the Wachuset and Dodge's Thornless, two varieties almost wholly free from thorns. We have seen and tested the fruit of the Wachuset, and though it is not of the largest size, it is of excellent quality. One of the greatest objections to cultivating this fruit, has been the difficulty with which the berries were picked and the bushes managed on account of the thorns. In these two sorts such objections are almost wholly removed, and if on further trial they shall prove to be equally productive and hardy with the older varieties, with the advantages that we have mentioned, they will be truly valuable, and we may reasonably expect to see blackberries planted in many gardens where they are now seldom found. A strong but not wet soil is better suited to this fruit than a light or sandy soil. They always succeed better when protected in some way from the effects of the winter, but it has been found difficult to lay down the thorny varieties. They should be set in hills or stools like raspberries, about five feet apart in the rows, with rows six or eight feet apart. A cheap trellis of stakes with wire stretched across is a great advantage, for the canes can then be tied up out of the way. This fruit always sells readily and brings a high price, and it is a pity we cannot grow more of it; but our experience has not been of the most favorable kind, and some of our neighbors have had no better success, and have abandoned the cultivation of this fruit entirely. We will not trespass further to speak of other fruits that can, under certain circumstances, be raised to profit. The cranberry is prominent in our mind, and we are glad to know that increased attention is being paid to the growing of this fruit every year. We hope the time is not far distant when the bogs, swamps and marshes of our whole State shall yield its ruddy fruit that shall equal the product of the cranberry fields of Cape Cod. But what shall we say more? for time would fail us to even briefly hint at many important things connected with the cultivation of various fruits both out of doors and under glass. Some inquiries naturally force themselves upon us, and many are ready to ask, as they have many times before, Is fruit culture profitable? We unhesitatingly answer yes, and profitable in more respects than one. But profitable in that one respect to which all minds are strongly drawn—that of actual proceeds or incomes in greenbacks; profitable as it tends to develop our better nature, to cultivate our taste, to add to the comfort of our homes, to subdue the stubborn and waste places, and make them bloom and smile beneath the golden and purple fruitage of autumn.

If great advances have been made in the last half century in our country, what may we not reasonably expect during the next twenty-five or fifty years? Vast tracts of territory that only a few years ago had never been visited by the Anglo-Saxon, to-day teem with bountiful harvests, rich rewards to the busy laborers on the great harvest-fields of the land. There are other fields far and near which, if planted with fruit trees and fruit-bearing vines and plants, will gladden the eye and the heart of the owner, and reaching in its results beyond the smiling plains or pleasant valleys, will cause even the heart of the little dirty, neglected child of the city to leap for joy as he beholds the rich and tempting fruits spread out before his eyes and sold so cheaply that the possessor of a penny even may be happy for a moment as he enjoys the rich, melting pear or luscious peach or more substantial apple. Think, my friends, of the old homestead farm, away it may be among the pleasant hills, that dear old place with its ten thousand pleasant memories, where grew in our childhood the very best apples and peaches and grapes that could possibly be found, as we thought then. Do we not remember how much we enjoyed even the fruits of those days, poor though they were? With no bed laden with President Wilder strawberries, or trees bending with Dana's Hovey pears! If, then, these things afforded so much satisfaction to us, shall we not, from the many hundred varieties of fruit on every hand, plant such as shall be a source of joy to those who now live and those who shall come after us? Shall we not make our homes attractive and pleasant, that when our children go out on to the great battle-field of life, they too may think of the old homestead with all its pleasant things, among the least of which will not be the orchard and garden?

Then cultivate fruit. Plant for yourselves; plant for your children; plant for your neighbors away off in the distant cities; plant for the stranger that may come among you; plant for all, and let all enjoy earth's richest fruits without stint or measure.

The CHAIRMAN. President Clark, with his usual courtesy, has asked me to offer a few remarks from the chair on this subject; but after the very able, sensible, useful and comprehensive address by the orator of the evening, there is very little left for me to say. I can, however, from practical knowledge, endorse almost, or quite everything, which he has said. His selection of fruits is admirable. They are fruits which are adapted certainly to Massachusetts, and there are very few places where they cannot be grown.

Of the apple, I might say that there are some new varieties which are coming in which will probably prove quite valuable and useful in Massachusetts. I allude, in particular, to the Tompkins County King, which I have no reason to think will not do as well in other places as in Dorchester, my own home. It is a large, fair, handsome red apple, and red is the color which commands the price. It is as handsome as the Baldwin, and the Baldwin is everywhere popular. It is a singular fact that the three most popular Eastern apples—the Baldwin, Roxbury Russet and Rhode Island Greening—are the three most popular apples at the West, where they grow so many millions of bushels. At many of the Western Fruit Conventions, votes have been taken as to what were the best varieties, and they have always resulted in favor of the Baldwin, the Rhode Island Greening and the Roxbury Russet. To these I think I may add, as one of the standard winter fruits, the Tompkins County King. I will not say more of the apple.

As to the pear, we have certainly had very great success in Massachusetts in the cultivation of this fruit, and our soils are not of the most congenial character for the culture of the pear; yet, with the indomitable perseverance, pride and competition of our cultivators, as the orator has said, near Boston, where the pear is cultivated more extensively than in any other place in the United States, we succeed in producing as fine pears as are grown anywhere. I had the pleasure, during a visit abroad last year, of seeing the largest and best gardens and nurseries in Europe, and I came home exceedingly gratified by the fact that I saw no cultivation anywhere, and no fruits anywhere, which were superior to our own.

Of the varieties of the pear alluded to this evening, the Beurrè d'Anjou, as is well known to a great many gentlemen present, is my favorite. I mean, that of the thousand varieties which I have proved by my own personal inspection, the Beurrè d'Anjou stands first on the list. So excellent is it, that I have increased the number of my trees until I possess now more than four hundred. I have no difficulty at all in selling my crop. I have just sent away the last of them to New York, at twenty-five dollars a barrel. It seems to be as hardy, to use a common expression, as an oak. It grows on dry soil and wet soil, on light soil and heavy soil. I have never seen an inch of wood that cankered or was injured by the winter; and in quality it is certainly all that could be desired. Now, ladies and gentlemen, it is a great privilege to live to my time of life, (for I introduced that pear more than thirty years ago,) and to feel that, if I have done nothing else, I have been the means of giving to the community such a fruit as the Beurrè d'Anjou. I believe Mr. Hyde has named no varieties this evening that I am not ready to endorse.

In regard to grape-culture, its extension is most marvellous in our country. It is, as Mr. Hyde has truly remarked, but a very few years—within the recollection of many present—since we had no varieties, except the very wild ones, other than the Isabella and the Catawba. Then followed that most glorious grape, the Concord—glorious, I say, because it gives to the million a fruit which they can all cultivate. Now, our Western territory is filled with grapes. I had the pleasure of visiting the great grape-show at Canandaigua this last autumn,—the largest exhibition ever made on the American continent,—and I was surprised and astonished at the superabundance and excellence of the fruit. So great has been the crop this year, that Concord grapes were sold at the vineyards for three and a half cents a pound, and Dianas for five cents a pound; and although I did not believe they paid a profit, it was said that they did. Afterwards I made a visit, on a commission, to taste the must of the grapes on Crooked Lake; and for eighteen miles the banks of that lake, facing to the south and south-west, (and so it is on many other lakes,) were covered with vineyards far surpassing those that I saw on the Rhine. So great had the crop of grapes been, that they had been unable to pick them, and when the frost came, on the 18th of October, it froze what there were in the vineyards; and when I was there they were loading the steamboats with grapes, and sending them down for wine, at one and two cents a pound—not that the grapes were injured for wine, but they would not do to send to market.

Such has been the progress of grape-culture, that on the shores of Lake Erie and its islands more than ten thousand acres have been planted. Millions and millions of vines have been planted on the shores of Lake Erie, and on the islands of that lake. I saw in one nurseryman's grounds sixteen hundred thousand cuttings that he had put in in one season, and in the September following he advertised that he could furnish no more—they had all been engaged. But, like the potato mania, which is somewhat alive now, the speculation in vines has come to its head—not that our hillsides are not to be clad like the vine-clad hills of the Rhine yet, but there has been so much speculation and zeal, and, I may add, disappointment has followed in so many cases, that at the present moment the sale of grape-vines for vineyards has become very dull. And now, without wishing to advocate (although I might be willing to express an opinion) the cultivation of the grape especially for wine, or to recommend its manufacture for common use, I may say that our wine manufacturers at the West are making wines which compare most favorably with the European wines. It was my privilege to act as chairman of the committee, of the American Commissioners at Paris, for the examination of wines, and the Foreign Commissioners had the liberality to say, when we showed them the Ives seedling and the Norton seedling,—grapes which make a legitimate red wine,—they had the liberality, and honesty, I might add, to say, "If you can raise such grapes and make such wines in your country, you want none from us."

But in the cultivation of the grape, more than almost any other fruit, we must select suitable situations and soils. That is the great secret. The grape wants a high, dry, hot location, and there it will always succeed. We have many hillsides in Massachusetts which, if they were only selected properly, would produce as fine grapes as are raised at the West. The only reason why we have not done so well the last few years is because of the superabundance of rain. We have had in the month of September, this year, about thirteen and a half inches of rain, against three and a half inches, the average for the last fifteen years. Under such circumstances, nothing could succeed. But at the West, from Rochester to Wisconsin, where it has been hot and dry, the grape grew with the utmost freedom, and ripened early; there was no disease; everything was propitious. But Providence is not partial in its blessings, and the time will come, as I said the other day in a public meeting, when the West will get a ducking, as we have this year; then, ladies and gentlemen, we shall have the grape growing in profusion, and ripening as well as it does there.

This subject is full of interest, I know. I have seen the profound attention which has been given to the orator this evening. There are many gentlemen present eminent in their profession as fruit-culturists, and I hope we shall hear from them on this subject. There is a gentleman present from a sister State who has raised a very fine seedling pear; and I believe that native fruits are much better adapted to our soils, and more likely to succeed, generally, than foreign fruits. I allude to Mr. Goodale, the Secretary of the State Board of Agriculture of Maine. The new seedling pear bears his own honorable name. I hope we may hear from Mr. Goodale on this subject of fruit-culture.

S. L. GOODALE, of Saco, Me. The Goodale pear was originated by my father from a seed of the McLaughlin, which is also supposed to be a native of Maine, about thirty years ago. The original tree is vigorous, healthy and hardy, having never suffered from any of our severe winters. It has never failed to bear a fair crop in any year since it began to bear.

The fruit is large and fair, and of very good quality, when not allowed to remain too long on the tree. If left too late, it decays at the centre. The flesh, tender, juicy, and very pleasantly flavored. Young trees, in the nursery, assume an upright habit, growing with great vigor, and come very early into bearing, often in the third year from grafting on the pear-stock. I do not consider it well adapted to the quince-root. The original tree has had only plain, orchard treatment, and from its abundant bearing has become as broad as high. It is not so much for any single trait that I value it, as for the combinations of qualities which render it, if it prove elsewhere as it is in the place of its origin, eminently fitted for extensive culture in orchards. It comes, in eating, about three weeks later than the Bartlett, and keeps in good condition until the Beurrè d'Anjou comes in.

The CHAIRMAN. The Agricultural College has been greatly indebted to a gentleman who has had signal success in the production of fruit under glass, and who has placed upon the platform these specimens of tropical fruit [two vigorous pineapples, with ripe fruit.] I wish we could hear from our friend

Dr. Durfee, of Fall River, especially with reference to the growth of the peach.

Dr. Durfee. I have no objection to stating my experience in growing and raising the peach under glass. It is something like fifteen years since I commenced. I had a house seventy-two feet long. I put a trellis against the wall of that house, and planted six trees, spreading them out fan-like upon the wall. I then had a trellis built in front, upon which I put six more. These trees, with the exception of one or two which have decayed, have borne every year from the first year they were set out, and I have had an abundance of fruit from those trees, of the finest quality. It has been said that you cannot get the peach in perfection under glass; that the fruit is watery, and insipid to the taste; but I think I can say that as fine peaches as ever grew have been grown under that glass for now something like fifteen years, and in great abundance; for I have had, every year, to thin them out, more or less, to prevent injury to the trees. Oftentimes I have taken off five out of six of every lot that exhibited itself on the trees, and then had an abundance of fruit. There are gentlemen here who have seen the fruit when growing, and I see a friend here who had an opportunity last fall of knowing something of the quality of the peach when grown.

That is the only way in which I have been able to cultivate the peach at all. I tried the cultivation of the peach on a trellis against a wall out of doors, and I found a north-west exposure was far better for the crop than any other exposure. I think a hot, scorching sun injures our peach-trees more than anything else, especially after a rain. I have noticed that when we had a shower of rain, followed by a hot sun, it almost invariably killed the buds, and I had no crop. I think, if any one desires to cultivate the peach, the best way is to try it under glass. I think it may be made profitable. I do not make it profitable, because I prefer to have the pleasure of giving them away, rather than to sell them.

The finest quality of peach that I know to be raised is what is called the George the Fourth. The Early Crawford is a very fine peach. I raise the Crawford early and the Crawford late; but I do not think the yellow peach, under glass, can be brought to that perfection that a white peach can.

I might further state that I have another house where I cultivate the peach, and part of the trees are in the ground, and part are in pots. I raise a great many in pots. My course has been to purchase a large number of trees the second year after the graft. I generally send to Long Island and buy, say a hundred at a time, and my gardener takes them and sets them out in the spring, cutting them down so as not to leave more than two buds on each tree. They grow up that season, and the next I have a good crop of peaches. Most of these peaches I have had in pots, as these pines are now in pots, which are cultivated under glass. And I would remark, in reference to pines, that it is very easy to cultivate them, if you have a house arranged for it. These were grown over a hot-air flue. I had a wooden box built, and filled in something like eighteen inches with tan, and the suckers which we clip from the sides of these plants are put into pots filled with good rich soil, which pots are embedded in the tan, and the heat underneath will keep them in a fine state of growth, and they will come into full bearing the first year. These came from my pinery yesterday, and my gardener took off most of the suckers which were on the sides. You will see that some of them are here now. There were large clusters around both of these pines, which have been cut off, which would have been fine pines to set out and bear a crop next season.

The CHAIRMAN. I have the pleasure of recognizing here this evening a gentleman who has performed very efficient service for many years in the Massachusetts Horticultural Society. I allude to Mr. Strong, its Vice-President, and Chairman of its Fruit Committee. I hope Mr. Strong will address the audience.

W. C. STRONG, of Newton. Our Chairman has left very little for us to say, his suggestions are so practical, and he covers the ground so entirely. But, as I have been called up, I will allude to one subject, with which, perhaps, I am least familiar, and it is because I feel a strong interest in it.

I was rather amused this afternoon, as I heard President Clark describe the work of the past year, and the improvements that have been made on the Agricultural College grounds, at the evident satisfaction with which he spoke of the industry of the students in rooting out his apple-orchard. That was the first lesson in fruit-culture which the students received, and I thought it would rather open the eyes of the farmers of Massachusetts. As we drove out of the grounds I saw the reason, and it was a very good reason, that he had for rooting out those apple-trees. You have said, Mr. President, that the soil of Massachusetts is not specially adapted to the culture of the pear. I think I may safely say that it is eminently suited to the culture of the apple. If you go further north than Massachusetts, to Maine and New Hampshire, you find that many varieties of apple are tender, and, more than this, the fruit does not attain that size and perfection that it does in this State. If you go still further north, into Canada, you find the fruit becomes crabbed. Then, if you go further south or west, you find that, although the fruit grows larger, it is watery, and does not attain that flavor and excellence, just the happy medium of crispness and spirit, which is desired. Massachusetts is eminently the home of the apple; and I hope that one of the lessons taught at the Agricultural College, and on the Agricultural College grounds, will be that the apple is eminently a Massachusetts fruit. It seems to me fitting that this institution should demonstrate this fact; for, as I have had occasion to say recently, this is a long experiment, the culture of the apple. It is an experiment which very few young men are inclined to undertake. It may be very well to say, "Plant the apple; plant it, if not for yourselves, for your children;" but mankind are selfish. We must take them as they are, and they will not do it. It is too long an experiment for most young men, who have an eye to immediate returns. They cannot wait fifteen, twenty, or thirty years for a fair return on their investment of money and labor, and they must wait longer than that for a full return from an apple orchard. Now, the Agricultural College can do this. I am not perfectly familiar with the location of the grounds, but I trust there is a good slope somewhere for an apple orchard, and an extensive apple orchard.

As I look over our State, I am inclined to think there are very few good specimens of apple culture—very few perfect specimens of apple culture. In the language of the orator of the evening, it is a shame that Massachusetts should be compelled, year after year, to import the larger part of her fruit, when we can grow very much better fruit at home. The only reason for this is because it is so long an experiment. There is no doubt at all that there are thousands upon thousands of acres of land in our State—I do not know but I state it too strongly, but thousands of acres—that are as well adapted to apple culture as any land on the face of the globe. If this be so, then this institution is the very institution that should undertake this experiment, and demonstrate to our farmers that the apple is a sure source of income ; that when skilfully cultivated, it is almost a certain crop—more certain than any other crop we grow.

I feel that the great point to be considered among us just now is this: that we study the exact habits of each kind of fruit. Take the apple. Our soil is eminently fitted for the culture of the apple, and consequently we must embark in it largely. We ought to embark in it so largely that we shall not only supply our own wants, but send to other portions of the country less favored than ourselves; and if our college has not proper grounds, I do feel that the money of the institution can be best expended in the purchase of some good location, where they can demonstrate to the State what can be done with an apple orchard. And so it is with other fruits. We are to study the exact requirements of each fruit; for we can grow, I had almost said, every kind of fruit, if we will study the requirements of each kind carefully. As good grapes have been grown in this State this year, when the rain-fall in September has been thirteen and a half inches, as in any other State in the Union. The same is true even of the peach. I do not mean to say that grapes can be grown to such an extent that we can afford to sell them at the price that has been stated by our Chairman, but we can always sell them, I believe, at a remunerative price. I think I should be willing to go further, and take even stronger ground than has been taken here this evening. There is no necessity for our selling our fruit at so low rates as have been suggested. This year, notwithstanding the flood of fruit that has been sent from the West, all the fruit we have raised has been sold at remunerative prices. None of our home grapes have been sold at less than twelve dollars a hundred.

I want to allude once more to the apple. There is a difference between the population of this State and some other States. In some States, where the population is large, the labor of children is very abundant, and they can pick the small fruits—the strawberry, for example—much cheaper than we can. The apple we can take care of. It requires very little labor for the market, and it comes at a season of the year which is favorable; and therefore I should place the apple where our orator has placed it, first on the list, and the most important. And it is really a subject worthy of consideration whether our legislature ought not to favor this interest, which in its nature has an inherent difficulty—the length of time required for its development. Our young men are ambitious for quick returns. They cannot have them with the apple, and therefore it is worthy of consideration whether our legislature should not give premiums for good apples, or in some other way encourage the culture of this fruit. Certainly we shall have a right to expect an experiment by our Agricultural College. I think the people will demand it.

The CHAIRMAN. While the subject is under consideration, I will ask gentlemen interested in fruit-culture to address the meeting. Among the number, I see our friend Moore, one of the members of the Board, who has had great success in the cultivation of the apple.

Mr. MOORE. I hardly know what to say, after the lecture we have had to-night, and the remarks from our friends. I should agree with Mr. Strong entirely in one remark he made; that is, that Massachusetts is the home of the apple. I should like to ask how we should have produced such varieties as the Williams, the Porter, the Hubbardston Nonsuch, the Baldwin, the Roxbury Russet, unless our soil had been favorable to the cultivation of the apple? They are certainly among the best, if not the best, varieties now cultivated in the Union, and certainly our soil would not have produced them unless it had been favorable.

I agree precisely with what the lecturer said with regard to raising apples near cities, or on high-priced land. I do not believe it would be profitable to put apples on land worth more than one hundred dollars an acre; but on rough hillsides, and back in the country, as the lecturer has said, there is no doubt but what it would be profitable to raise apples.

But there are a great many here who would interest this audience more than I should, and I think they had better talk instead of myself.

The Chairman. I believe we have with us another member of the Board who has for many years given his attention to the cultivation of the apple—Mr. Clement.

Asa Clement, of Dracut. I did not expect to be called upon to-night to speak on this question, and I perceive that the audience has become considerably weary of the long sittings; but as you have called me up, I would like to ask one or two questions in relation to apples, and hope somebody will be able to answer them after I get through, and that will be very soon.

I have noticed lately—say for the last six years—that many of the Baldwin trees, which look very healthy ordinarily, blossom fully but do not set much fruit, and what fruit does set does not mature well; it is small. We had, in the orchards round Lowell last season, large numbers of Baldwin apple-trees which blew full, but did not set much fruit, and what there was was poor and insipid in quality, small in size, and knurly. Ordinarily, when fruit is thin on the trees, we expect it to grow a little larger, or hope it will; it seems to be thinned out naturally; but that has not been the case lately with the Baldwin. I cannot account for this fact, and I hope somebody will be able to tell us the reason for the failure of the Baldwin apple.

Then there is another thing. The Hubbardston Nonsuch, with me, bears regularly alternate years, and they never have done better, within my recollection, than in 1866 and 1868, the two last bearing years. The tree bears enormous crops, and the fruit is very fine. The Williams never produced such crops on my grounds as last year. The Foundling, (some call it the River apple in the vicinity of Boston, and some the Fontinelle,) has produced remarkable crops this year in the vicinity of Lowell, and others could be named; while other varieties, which blew well, have failed almost entirely. Now I would like to know how to account for this. I cannot myself.

I do not propose to detain you any longer, but I want some one to tell me how it is that a few varieties bear well, and others, with equal care and attention, fail.

The Chairman. I presume my estimable friend, Colonel Stone, a new member from the Norfolk Society, can answer those inquiries.

Col. Stone.—I know this audience is tired out with listening to these remarks, and I think the question asked by our friend from Lowell is not so easily answered. I admit the fact that he states, but why it is so is beyond my knowledge. I have been very much interested and pleased with the discussion here this evening. I think if our friend Strong would visit the orchard of the Clapps, in Dorchester, he would find an orchard that cannot be duplicated in this State or in the United States ; and any gentleman who is anxious to learn anything in regard to the cultivation of the pear or the apple, by going there can receive instruction which may be of great advantage to him. They are modest people, but very kind, excellent people, and will be happy to give any one all the information in their possession that they can. They will tell you just what to do, and you may judge for yourself. There are no more skilful cultivators of the pear or the apple in New England than your neighbors, Mr. President, the Clapp Brothers.

But it is time we were closing our meeting, and I will not detain you.

The CHAIRMAN. My young friend has not been accustomed to being out in the evening.

It would be pleasant to discuss this subject of the apple further. We have some eminent growers with us. Among them I notice General Newhall, of Lynnfield. Shall we hear from him ?

Gen. NEWHALL. Mr. President, I came this evening for the purpose of hearing remarks upon the cultivation of the apple, not thinking that I should be called upon to say anything in relation to the subject. I have, however, had some experience in the cultivation of the apple. The objection has frequently been made to its cultivation by younger men than myself, that they would reap but little benefit from it themselves. So far as my own experience goes, I can state this. Some years ago I found that the trees upon my place were so old, that if young trees were not planted I should have no fruit in a few years. Therefore, in the first place, I planted a nursery of trees, cultivated those trees, set them out, and I have gathered some years hundreds of barrels of Baldwins and Roxbury Russets from those trees. Among the best results I ever had, I gathered from three trees four barrels each after they had been set but nine years. They were set upon a deep, alluvial soil, somewhat rocky, and the trees grew remarkably well. I remember, when

I was a younger man, a relative of mine, in what is now the city of Lynn, had about twenty acres of land, and had but two or three apple-trees upon it. When he was forty years old he purchased a hundred trees, and planted them on about an acre of good land on the south part of the Common of Lynn. While he was setting those trees, one of the Friends or Quakers of Lynn, who was passing by, asked him if he ever expected to derive any benefit himself from the trees he was setting out, at his age. He replied that if he did not somebody else would. He planted those trees, and lived to sell hundreds of barrels of apples from them in bearing years, and supplied this very Quaker with some of the fruit. If any young man is disposed to cultivate the apple or any other fruit, if he will select good trees and cultivate them well, there is no doubt in the world that he will derive benefit from them; and, if he lives to the common age of man, derive benefit from them for many years after they come into bearing.

There is one thing in relation to setting out apple-trees. You want to get good thrifty trees, and those that are grafted upon seedling stock. A few years since I wanted a few varieties of apples that I had never tried, and I sent to Western New York and obtained ten trees. I planted them on good soil, but the trees made very little growth. The next year I had occasion to obtain some trees from Parsons & Co., Long Island, and, talking with Mr. Parsons about those trees, I mentioned the fact that they had not grown well, and he said the reason, in his opinion, was that they were grafted upon root-cuttings, the nurserymen not knowing any better. He said his trees were all grafted upon seedlings raised in the nursery and grafted on the best stocks. This was ten years ago, and now one of the trees that I had from Parsons & Co. would weigh down six of the others, which were, as I have since ascertained, grafted upon pieces of root six inches in length. That practice ought never to be followed, and I would advise any young man who is going to plant an orchard to be sure, if he purchases trees from a nursery, to get those grafted upon seedling stocks instead of upon pieces of root.

After all, this talk about waiting for trees is a mere fallacy. If a young man plants good trees when he is five and twenty years old, if he lives to the common age of man, he will find that those trees have arrived to their full perfection of bearing, and that he will derive as much benefit from the trees as a subsequent generation, probably. Many of the old varieties, that have been in cultivation for a hundred years, would decline before a young man arrives at the common age of man, and are not worth cultivating. Some think that any variety may be cultivated indefinitely; but it is not so. A tree has its youth, maturity and decline. That is the law of nature, and if you plant these old varieties they will decline before you do. Therefore, let the young man be sure to get a comparatively young and thrifty variety to plant, give the tree good cultivation, and he will soon begin to reap his reward in dollars and cents, aside from the profit and interest there is in the cultivation of fruit. If you plant seeds and raise seedling trees, you may get something that is better than any variety we have, although, in that case, you will get a great many common or fair apples where you get one good one. In regard to pears, I will mention that, some fifteen years ago, I planted the seeds from the best pears that I could obtain, and I have about thirty seedlings now growing. They are thrifty, and some have come into bearing. Some of them produce very fair fruit, but not equal in quality, perhaps, to many varieties you have. But when you plant a seedling tree and get a fair pear, you have a tree that will last a century; whereas these grafted trees of the old varieties grow for a few years, and you get the fruit, and then they die before you think of it. From my experience, I should recommend a young man to plant the seed of the best varieties of pear; let the tree stand where it comes up, never cutting the tap-root, and it will last for centuries. I measured a pear-tree growing upon our light soil about two years ago, and found that it was six feet and four inches in circumference. It never had any cultivation at all. It was a seedling tree, and bore the Button pear. I have had grafted trees under cultivation these five and twenty years, and with all the cultivation I can give them, some of them show signs of decline now; whereas, some seedling trees that I have had planted perhaps twenty years are still very thrifty, and some of them have attained ten inches in diameter, and look as though they would grow for a century to come. Therefore I think it is very important for a young man who is going to set out an orchard to be careful and get the best trees;

give them good cultivation, and he will begin to reap the benefit of his trees much sooner than he anticipates. A tree grows fast if you don't think much about it. My place is about ten miles out of Boston. Some thirty years ago I was in Boston for eight or ten years, and at that time there was no conveyance by railroad between the two places. One spring a gentleman of Boston gave me a few scions of a specially good pear, and, as I had some leisure time, I undertook to walk ten miles home to graft those scions. It was a warm day, early in May, and when I had walked about two-thirds of the distance I was a little fatigued, and sat down upon a stone under the shade of a willow tree. Before resuming my walk, I took out my knife and cut a cane from the tree, and when I got home, as I went out into the garden to set those scions, I stuck that cane down in a moist place near the kitchen sink, and it took root and grew. After three or four years I transplanted it to the side of the street, and that tree (the cane that I walked with part of the way from Boston,) is now thirty inches in diameter. I mention this merely to show that it does not take so long a time to raise a tree as many people think. Therefore I advise every man, especially the young students at the Agricultural College, if they go to farming, to plant trees when they are young. They will not only derive a great deal of pleasure from it, but they will be sure to enjoy the benefit of the trees before they arrive at the common age of man.

The CHAIRMAN. I confess to a delinquency of duty in not calling upon my friend, Rev. Mr. Clift, who is immediately before me, and whom I should have recognized before; for I have known him in former years as one of the most eminent fruit-culturists with whom I was acquainted.

WILLIAM CLIFT, of New York. I have always taken you, Mr. President, for authority in fruit matters, and I am sorry to be obliged to differ from you a little this evening. I do not share the apprehensions that have been expressed in regard to the over-production of the grape. It may be very true that in the particular localities where the grape is made a specialty there is a greater production than can be marketed in the immediate vicinity, and it is true that this year and last more grapes have been sent to the New York market than could well be disposed of. They have come there by the ton, and they have been sold very cheap. Many have come in bad condition, and these have probably been sold at a loss to the producer, and perhaps at a loss to the middle-men who have undertaken to market them. But last year was the first time the New York market has ever been adequately supplied with grapes; and even in these two years, when there has been such an abundance of grapes on the Lake shore, at Canandaigua, about Crooked Lake, and perhaps in several parts of Ohio, if you go into the small towns and villages, even in New York State, and all through New England, you will find a very great dearth of grapes; and, with all this abundance, I presume you may go through Connecticut and Massachusetts and you will find scores of farmers in every town who have not a single grape-vine upon their farms. If some way could be devised by which this superabundance in particular localities could be distributed evenly over the whole country, it would be a very great blessing. I think it will be now a score of years, at least, before we shall have grapes enough to feed the millions of farmers in our land; for these spots where grapes are cultivated in superabundance are but as specks upon the surface of our country. I do not, therefore, share the apprehensions that have been expressed in regard to a glut of the market.

Now, if some man can devise a plan by which the grapes that are produced shall be evenly distributed over the country, I think he will find that it will be a good while before the market shall be adequately supplied; for even farmers would be glad to buy grapes if they could get them for six, or even ten cents a pound, and I believe they can be produced at a profit and sold for six cents a pound. We want some means by which this fruit can be sent as easily as flour. Flour and apples are transported very cheaply, because they come in barrels. I believe it costs only about a quarter of a dollar to send a barrel of flour from Ohio to the New York market. If we can have grapes transported as cheaply as flour or apples they will go to all parts of the country, and it will be years before we shall have grapes enough to supply the wants of the millions of our people.

In regard to apples, I think the only reason why we do not have them in such abundance as formerly is because people have grown lax and negligent in regard to their cultivation. Not one man in a hundred pays much attention to his orchard.

Trees are set out in a very careless way—perhaps cultivated a year or two, then run over with grass, and nothing more is done for them. But if a man will cultivate his orchard as he does his corn-field, dressing his trees, pruning them properly, and cultivating root-crops among them, using manures judiciously, he will bring them forward so that in ten or twelve years he will have an abundant crop of apples every year.

The CHAIRMAN. The Chair agrees entirely with the remarks of Mr. Clift. In referring to the glut of grapes in the market, I alluded to the vines, and not to the fruit. We have not yet begun the production of grapes for our country.

On the 19th day of August we had 1,200 pounds of Concords and Delawares sent from Southern Illinois; and I may mention, in connection with that fact, that we had from Georgia, on the same day, Duchess and Beurrè d'Anjou, and other autumn pears. And I may mention also this fact, that as foreign grapes grow very well in California, we shall probably have, within two years from this time, Muscats, Black Hamburghs, and other foreign grapes, in six days from California, sent to our markets. But we have not yet got a grape apiece for our population—certainly not a bunch.

I should be guilty of neglect if I did not recognize, whenever the grape is alluded to, the gentleman whose name is immortalized as the producer of the Concord grape. No occasion like the present can be complete, unless we hear from Mr. Bull.

Hon. E. W. BULL, of Concord. It was not my intention to say a word here this evening, if I could avoid it, though, I confess, I came into this room with some misgivings; for I was warned by the orator, in advance, that he should probably run against my opinions, and I feared it would lead to a conflict which I could not avoid. I need not say how gratified I have been with that discourse of his. I find in his experience, in other localities, not that which upsets the propositions I have had the honor to offer to this Board before, but that which, in almost every respect, corroborates them—that too close planting, too close pruning and summer pinching, are pernicious to the grape, and that to avoid mildew and blight, and other grape diseases, you must give them room according to their strength. His position is, that the American grape, the hardy grape, must have extension; and he has brought to your attention the fact that vines growing in apple-trees grow vigorously, and give hundreds of pounds of grapes. Let me state a single instance, which will further show that proposition to be true. In the town of Woburn, in Middlesex County, grows a grape-vine which covers the whole front of a house, which bore, the year before last, eight bushels of perfectly ripe grapes.

These instances show that we are yet learners in grape culture, and that, as my friend Mr. Strong said, we are to learn the true method of culture, and then our fruit-crop will be sure. All kinds of fruit which have been grown successfully at any time, I contend can be grown with success at all times, certainly, consideration being had for the various seasons, both as to the amount of fruit and the quality.

As to the price of grapes. It occurred to me, when our honorable chairman stated the price at which grapes were sold at Crooked Lake, that I was not sure that even that price would not be remunerative. Take the empire of France, which gives this year 1,100,000,000 gallons of wine, and which seldom falls under 830,000,000, where grapes sell for two cents a pound, and where the wine pressed out of the grape at the vineyard is taken at twenty-five cents a gallon, to be ripened in due season; and then take the returns of the Minister of the Interior, in regard to the average value of the grape per acre, and you find it reaches one hundred and thirty-four dollars. Even at that low price, you can see it is more profitable than our ordinary husbandry.

But I will not weary the audience with any further remarks on grape culture. I desire to offer a vote of thanks to President Hyde for the able and instructive address he has given us to-night—an address which embodies the rich experience of a whole lifetime in his own vineyard; an intelligent observation, which is rarely at fault, and a large, perhaps a larger communication than any other man in the State, in regard to horticulture. I am glad to offer that motion before we adjourn.

The motion was put, and carried unanimously.

The CHAIRMAN. I have great pleasure in communicating that vote to Mr. Hyde.

Mr. HYDE. I feel that I do not deserve it, but I thank the audience for it.

I ought not to occupy another moment, but I will state a fact or two. I said something about growing grapes in trees. Now, I know we are laughed at for talking about growing grapes in trees. Scientific agriculture laughs at us; but when I can turn round and say that I have a grape-vine that has grown for twenty years in a black cherry-tree, (and that is the best use it was ever put to,) and produced from two and a half to four bushels a year, which I sold this year for ten cents a pound, I do not care much for the laughter of science. I regard science with as much respect as anybody else, but when a man can grow good grapes in a worthless tree, in some worthless corner of his garden, and get a good crop, why should he not do it, and let science laugh?

A friend of mine has a Concord grape-vine which yields a hundred pounds every year, and it has never failed to ripen. There are a hundred pounds, that he got twelve or fifteen cents a pound for, this year. You will not get bunches weighing a pound or a pound and a half from a vine that you allow to run into a tree, as you may if you check and cramp it, and make it throw its strength into a few bunches; but see what a quantity you get! And the quality is as good, even better. Mr. Leach, of Wilmington, N. C., describes the original Skuppernong grape-vine in that State as a vine two feet in diameter, which runs all over the trees, and yields fifty bushels a year. Does it pay to grow grapes in trees? It does down there, certainly.

The CHAIRMAN. It would be exceedingly agreeable to the Chair to sit here and listen to remarks upon this subject until early morning; but I am reminded by gentlemen that the time for adjournment has arrived.

The Board then adjourned, to meet at 10 o'clock on Wednesday morning.

SECOND DAY.

WEDNESDAY, December 9.

The Board was called to order at 10 o'clock by Col. Wilder, and on motion of Mr. Birnie, Hon. GEORGE A. KING, of Barnstable, was elected chairman for the day.

Mr. KING, on taking the chair, said:—

I am obliged to you, gentlemen, for whatever of honor there is implied in the election to preside over your deliberations to-day. I suppose it is unnecessary and will not be expected that I should detain you with any remarks of my own, and I will ask you, therefore, to proceed with the business of the meeting.

The first business of the morning is a discussion on COMMERCIAL FERTILIZERS, to be introduced by Col. M. C. WELD, of New York City, whom I have the pleasure of introducing to you.

ADDRESS OF COL. M. C. WELD.

Mr. President and Gentlemen,—I was hardly aware, when I accepted the invitation of your Secretary to open this discussion, of the amount of preparation which really ought to be given to it. Neither was I aware, not having participated in these discussions previously, of the manner in which they are usually opened. I must beg your indulgence, therefore, if you find any lack in the manner in which I present the subject.

The subject which I selected, at Mr. Flint's request, for discussion, is announced as "Commercial Fertilizers." We understand by commercial fertilizers substances purporting to be concentrated forms of manure, commonly offered for sale. And though we might, properly enough, perhaps, include agricultural lime, plaster, leached wood ashes and similar articles, acting rather mechanically and chemically upon the soil, as *plant-food*, we will not now consider them. There is also a great variety of substances which may be purchased and employed as manure, such as the wastes of many manufacturing establishments, accumulations which have been and are still wasted, perhaps, but, with the ever increasing need for manure, are one after another utilized. At first they are given away for the removal, then they are sold at a low price, and as soon as a little competition occurs they are bid up to their true value, or pretty near it. This has been the case with woollen waste, horn shavings, leather scraps and trimmings, &c. All those articles, valuable though they are, and worthy subjects of purchase and sale, are not included under the term commercial fertilizers, as employed at present. I will name simply as types of the articles under consideration, Peruvian guano and bone-dust.

Before discussing the merits of the fertilizers themselves, it may be well to consider *what need the farmer has to use them.* This question opens, to be sure, the whole range of agricultural discussion, but I will endeavor to be brief in the consideration of it.

Mr. George Geddes, of Onondaga County, N. Y., said, at a meeting of farmers a few days ago, to the effect that, though now an old man, and having an excellent farm, which he has kept constantly improving for many years, the only manures he has used have been *clover and the sheep's foot.* I can hardly take him literally, for he certainly made large quantities of barn-yard manure and applied that; but, besides that, sheep's foot and clover have been his manures. His sales have probably been wool, mutton, beef and wheat, and perhaps the products of his dairy. Taking him at his word, he has been impoverishing his soil all this time that it has been growing better. Here is a paradox—such an one as farmers often meet with. We know, if he sells mutton of his own raising, he takes much from the soil, yet it grows better because the clover brings up from the subsoil enough of enrichment to keep the balance in the farmer's favor. But that this cannot last forever is obvious, and for the reason that the sheep, to take them as a single article sold from the farm, draw their entire bony frame from the soil itself, and that is sold with the sheep.

Decompositions go on within the soil by the action of the air and moisture, warmth and cold, which are constantly rendering available a certain amount of plant-food.

There are some soils in which these agents, with sufficient tillage, will develop really wonderful fertility, which is maintained without apparent decrease for hundreds of years. But it is safe to say Mr. Geddes' soil is not one of these. It is safe to say also he has sold no hay or straw, very little corn, if any, and it follows that he has fed upon the place, and returned to the soil as barn-yard manure, so far as possible, all that he has raised, except the products enumerated. Nevertheless, we can hardly credit his statement, unless he admits that he has all this time, or a good part of it, bought and fed oil-cake, or some other provender, which he did not raise. This will account for the constant improvement; this will make a balance in his favor at the bank; this will supply the losses of the soil in furnishing bones to lambs and calves, phosphates and alkalies to milk, and ashes to wheat, &c., and enable the honored farmer of Fair-mount to extol clover and the tread of his fleecy flocks with a clear conscience.

Farmers too often overlook the fact, that by feeding oil-cake and corn-fodder or straw to their flocks, they are not only gaining the benefit of a cheap purchase, perhaps, but greatly adding to the inorganic constituents of their land.

In thus reasoning upon the rather startling statement of Mr. Geddes, we concede three things, viz. :—

That the bones and inorganic parts of the animals are derived from the plants.

That the plants obtain them from the soil.

That they are essential food for the plant, and must exist in fertile soils.

These propositions are true. It is true also that in most soils continued cropping rapidly reduces the supply and decreases fertility, unless both be maintained by manuring.

These propositions, which I here allude to in general terms as the result of a simple course of thought upon that statement of Mr. Geddes, I do not propose to argue. They have been proved so many times, and are so universally acknowledged by intelligent agriculturists, that we may take them as agricultural axioms.

The wise farmer allows no manure to waste; he composts the droppings of his animals with straw and litter; he makes the swamps and woods contribute to his manure heaps; he keeps his farm up by one year after another enriching different fields, and he sends the long-rooted clover to bring up the hidden wealth of the subsoil. With all this he will find it is with the whole farm as it is with the single field—in time it will feel the draft, and the farmer must look beyond the resources of the farm itself to supply what he sends away in his marketable productions, whatever they may be.

No matter what the farmer sells, he sells the inorganic constituents of his soil. If he would keep his soil improving, or not decreasing in value, he must restore those in some way.

This necessity to purchase has created the traffic in fertilizers.

If a farm is chiefly devoted to grazing, and the number of cattle, great and small, is such that a great abundance of barnyard manure is made every winter, for the enrichment of the fields under tillage crops, and the sales made are either of grains or animal products, the soil will probably first show a lack of phosphates, and the addition of *bone-dust* will increase the yield of all the crops. Root crops, especially turnips, are perhaps more sensitive to a failure of the phosphates than any other crop. *Potash* fails also early, and the land is very grateful for a supply. And so, one after another essential constituents of the ash of plants fail, and the productions of the farm proportionately decrease.

Farmers upon the old grazing farms of New England are driven to the use of bone-dust, (or some form of *phosphoric acid*, which we know is its potent principle,) and the decided benefit almost uniformly experienced from its use in all soils and all situations, fit for any kind of tillage, renders the fact that it is valuable as manure universally admitted.

A statement of Prof. Voelcker, of London, a distinguished agricultural chemist, that bones are the first manure which a farmer usually buys, and which farming communities demand, interested me. He states, in considerable detail, that wherever agriculture is improved, throughout the world, the first lack of the farmer is phosphates. The easiest source of supply is bones, and not until that lack has been supplied in the soil does he begin to search for ammoniacal manures.

The fields which receive year after year, in rotation, the great bulk of the manures of the farm, are often comparatively rich in the *phosphates* and *alkalies*, while the out-lots and pastures have been robbed for their benefit.

This being the fact, we can easily account for the apparent improvement of farms, when, in reality, they are losing value. I find, wherever good farming prevails, that land not exhausted comes up. It shows almost at once the good tillage; responds promptly. It shows an increase of manurial wealth in the soil, even though the manures applied be altogether produced upon the farm itself. And yet there is a draft somewhere. That draft must be either upon the subsoil, upon the swamps, upon the woods, or upon some part of the outlying portions of the farm.

It is natural that on such land pure phosphates would produce much less striking effects than upon those fields where a real lack exists. Nevertheless, it is almost impossible to find any farm-lot, whatever be the crop, which a good dressing of bones or mineral phosphates will not benefit. The task, then, to demonstrate that these manures (phosphates and alkalies) are not highly beneficial to the land will hardly be undertaken.

Ammonia, the source of nitrogen to the plant, occupies, however, a different position with reference to the farmer. There is an abundance in the air for all natural vegetation. It exists in the humus which forms in, and, we may say, is essential to, all tillable soils, and by the air and the humus is easily given up to the plant. So far as vegetation is concerned, it is as universally diffused as water.

There is some ground, then, for philosophers to argue against placing a very high value upon this widely disseminated substance.

When, however, we come to the direct testimony of the soil and the farmers, we find its application productive, upon tolerably good soils, of fairly startling results.

If all the essential *ash* constituents abound in the soil, in connection with good tillage and proper mechanical conditions, with no lack of water, even though no ammonia be present, save that which is in the air, there will be good crops of grain, but the addition of ammonia produces those wonderful crops which otherwise only virgin soils of great richness ever yield.

Without, then, entering upon the consideration of what classes of crops are most benefited by ammonia, and which respond most noticeably to applications of the phosphates, it is enough for our present purpose to recognize this distinction, viz.: that *the highest effects* of phosphate of lime, in any form, and of wood-ashes, the source of potash, are seen on rather hard, worn, but naturally good soils; while the best effects of ammoniacal manures are observed in connection with these inorganic constituents, existing in the soil in sufficient abundance, or applied with the ammoniacal manure. We use the terms *ammoniacal* and *nitrogenous* as nearly synonymous. The distinction should always be recognized between manures which yield quickly to the influences of decomposition, and those in which the nitrogen is so locked up that it remains long in the soil. Thus, leather clippings yield much ammonia, but they are a very long time in undergoing decomposition. Fresh ground bones yield to the plant both phosphoric acid and ammonia, but from the grease they contain, and for other reasons, remain long in the soil unless ground very fine.

We are forced also to make similar distinctions in regard to phosphatic, and indeed all other manures; *the finer their state of division*, or *solubility in water*,—which is the same thing,—the more quickly available are they to the plant.

Manures in which, from this source, (being animal remains, as fish or butchers' offal, or wool or hair; or animal excrement, as guano, hen manure, poudrette, &c.; or the remains of plants, as castor-pomace, cotton-seed, &c.,) contain the elements of rapid decay, although no ammonia, or but little, may exist ready formed, yet, as they quickly become incorporated with the soil, and part and parcel of it, they may be regarded as of nearly equal value with those manures in which the articles of vegetable food are at once soluble in water. This is especially true, inasmuch as the most valuable soluble manures do not remain long soluble after becoming intimately mingled with the soil, or when applied in solution; for the soluble phosphates are at once rendered insoluble, by having the excess of acid neutralized, and the ammonia forms combinations by which its washing away is prevented and it is retained for the use of the plant.

Turning now to the sources of supply available to the farmer, whereby he may maintain his fields in their pristine fertility, and increase his crops besides, and recognizing fully the fact that for all drafts made upon the soil he must return a full equivalent, we shall find—

1. His first effort must be to know the resources of his own farm. *Muck-beds* must be proved, and the underlying marl or sand tested. Crumbling rocks have often proved of great value.

With your permission, I would like to refer to some analyses of muck made several years ago by Professor Johnson, of New Haven, which, taken in connection with this subject, are very interesting. A great many commercial fertilizers, offered at high prices in the market, and valuable for their ammonia and their phosphoric acid, perhaps in many cases vaunted chiefly as valuable on account of the ammonia they contain, are advertised as containing only three, four, five or six per cent. of ammonia. They are in a dry form, and sold by the ton, as we all know, in barrels or boxes. This table of the analyses of muck-beds was made by Professor Johnson, at the suggestion of the Secretary of the Connecticut State Agricultural Society. He was at the time, and is now, I believe, chemist to that society. He found in the muck-beds of the State, almost uniformly, large amounts of ammonia. The same is true of the muck-beds of the whole country, and it is altogether probable that, in the thirty-three samples presented to him, by no means the richest beds were found. The average of ammonia in the beds was 1.37 per cent. Some of the largest figures are 2.24, 2.71, 2.55, 2.92, 3.54, 2.28, 2.04, 2.14. That is in the natural peat. In the thoroughly dried peat the amounts are very much larger—3.10 per cent., 3.12, 4.89, 4.56, (in two or three cases,) and in one case 5.41, per cent., making an average in the dried organic matter of the peats of 3.14. I mention this to show what folly it is for farmers to purchase, at high prices, fertilizers for manure, when such supplies are not exhausted.

2. Next the farmer should search his locality—examining the wastes of manufacturing establishments, slaughter-houses, woollen-mills, breweries, &c. We are by no means sufficiently familiar with the very rich products of many of these establishments. The farmer who buys the brewers' grains finds that he is enriching his land very essentially. The hop-waste, which is not fed, and almost all the waste of a brewery, are of very great manurial value. And so we can hardly take any branch of our manufactures, except perhaps those in which the nitrates are so mingled with poisonous metallic salts that they cannot be used, but we shall find them rich sources of neglected manurial wealth.

3. These sources being exhausted, he should seek the market, and is at once met by the questions, What shall he pay? What can he afford to pay? Two very different questions. The farmer is obliged to pay the market price. That does not settle his need. A farmer may apply one hundred pounds of guano, worth five dollars, to an acre of buckwheat, and obtain a crop worth four or five times what the land would have yielded without the guano. Should he, then, have paid twenty dollars, he might still have been the gainer, and well satisfied. So it is with every other manure. The *agricultural value* depends upon the condition of the soil, and the use which each farmer makes of the material. The *market value*—that is, *the fair price*—depends upon the sources of supply available to the

merchant, and the demand for his goods. It is regulated, just as every other market value is regulated, by supply and demand. The farmer cannot afford to pay twenty dollars a hundred for manure, when he can buy it for five dollars, or a little less, as he can now. He can only afford to pay the lowest price at which he can get the article, no matter what its value is upon his land. In this way, we must distinguish accurately between the agricultural value of all manures. At present, the manure market of the whole civilized world is regulated by the Peruvian government. Through her agents, she sells her inestimable guano in every market of America and Europe, *at the same price*. The price here has been for years sixty dollars a ton, and it has been the same price the world over. The price is now sixty-two dollars and fifty cents, in gold. We pay precisely the same that other people pay, everywhere else, and this regulates values very accurately. This guano does not vary greatly in quality, and at the price asked even the poorest qualities are worth the money.

This is the cheapest available market source of ammonia. Occasionally crude ammonia salts or nitrates may be bought cheaper; but the price of guano does not vary, and it has and will rule the market and establish the standard. Bones and the phosphatic guanos furnish the bulk of the phosphates. The price varies according to the abundance of the supply, but not greatly. Still the phosphates have steadily increased in price in this country for some time—due, in a great measure, to the demand for shipment to Europe, and to the greatly increased use made of them among our own farmers.

The increase in the use of bones among farmers, as stated by Dr. Voelcker, already quoted, indicates very clearly the progress in agriculture, or the progress of the exhaustion of the soil of its manurial constituents—and that is very much the same thing. The farmer who has the ability quickly to exhaust his soil of its ash constituents—the constituents of available plant-food—and obtain them in his crops, is a better farmer than he who cannot do it. The better our appliances and facilities for thorough tillage, the better are we able to convert the available plant-food into salable crops. We are led, then, to the necessity of considering closely the standard whereby farmers may judge whether they pay more or less than the manure is worth, and the means by which farmers can obtain that information. Farmers find that they need manure, and they have an abiding faith that, unless they are cheated in the quality, Peruvian guano, or some superphosphate, is the best fertilizer they can buy, without really knowing accurately why it is so. I speak of the common farmers, who are apt to think that guano and phosphates, if they are good, will satisfy the wants of their farms. They buy, and are entirely satisfied with the results. There is hardly any manure in the market which, if applied to worn-out soil, will not produce satisfactory results to an ordinary farmer. He supposes that he has obtained the value of his money, and is well satisfied that the investment always pays. This is his estimate, based upon his knowledge of the agricultural value—the value to himself. He may be paying two or three times as much as the manure is worth. The distinction between the agricultural value and the market value of a manure is a matter of which it is the object of the manure-vendors, as a rule, to keep the farmers in ignorance. All fertilizers ought to be sold with an analysis, and a warrant that the goods delivered shall be equal to the analysis. The purchaser is then at liberty, if he suspects fraud, to have a new sample taken, and an analysis made by a competent chemist, and the fraudulent dealer punished, exposed and forced to make good the damage. But that is not the way we do business. The dealer in fertilizers has his manure analyzed. He sends a sample to a chemist, to the State assayer, or somebody else who has a title and is recognized by farmers as an authority ; the analysis is made ; it gives results favorable to the vendor, of course, (he would send no other sample,) and the manure is sold on that analysis. The farmer may very well think of the possibility of the seller of the manure sending one sample to be analyzed and putting upon the market quite a different article ; but if the manure proves satisfactory in its results, he is then convinced, and needs no other proof that the manufacturer is honest, and that the article which he buys is very similar to that which has been analyzed. This is a great mistake. A series of analyses made by Prof. Johnson, already quoted, proved that very few of the manipulated guanos or superphosphates which were in the market of Connecticut a few years ago were anywhere near up to the proper standard of market value. They were extensively bought; they were used with great satisfaction; the manufacturers could obtain certificates from the very first farmers in every town of the value of their manures; and yet they were selling a very inferior article—that is, they were asking a much too high price for the article sold. The article, it may be, was good, but the price was altogether extravagant.

The chemical test is the only reliable one for the market value of fertilizers; the only one which will bear thorough scrutiny; the only one which can be applied economically; the only one which, with the farmer's best facilities for experimenting with manures, he can rely upon. If a farmer is so situated that he can try parallel experiments on soils of precisely or very nearly the same character, and can use a certain quantity—so many dollars' worth of Peruvian guano on so many square rods—and then use a variety of other commercial fertilizers on other pieces of land, and can crop those pieces with different crops, he may come to pretty nearly as accurate an estimate of values as the chemist; but still the chemist will have a very great advantage. If, for instance, a piece of land of great uniformity be divided so as to have several manures used upon it, and grass and wheat and turnips and some other root crop—say parsnips or carrots—grown upon it, so that each manure is tested by these different crops, on the same soil and in varying quantities also, a very close approximation to the actual value of the manure may be obtained. One manure will be found to benefit the turnip crop, while it does not essentially benefit the wheat or grass crop; one will benefit Indian corn or mangolds or some rank feeding crop, while the effect upon wheat or upon turnips will not be so very great; and so the farmer who should attempt to determine accurately, or the experimental farm on which any such series of experiments should be undertaken, with a view to determine accurately the market value of these crops, would be put to immense expense, to very little purpose. A good chemist would, in a short time, save them all the trouble.

The price which agriculturists ought to pay is about that for which they can procure an equivalent for any manure. Consequently, it is not difficult, with sufficient chemical knowledge, to get at a pretty fair scale of prices for the various ingredients of manure. If we take the cheapest available sources of supply of the most valuable ingredients of manures, we find that twenty cents a pound for ammonia, (perhaps I might say twenty-five cents a pound,) five or six cents a pound for phosphoric acid, fourteen or sixteen cents a pound for soluble phosphoric acid, and five cents a pound for potash, are very fair values for these different ingredients. Now, if we bring Peruvian guano to this test, calculating by percentages exactly the amount that it is worth, we shall find that the price will a little overrun, if anything, the actual price asked in the market now, which is about $90, in currency, per ton of 2,000 pounds. Applying the same scale to almost any commercial fertilizer in the market—to the manipulated fertilizers especially, the superphosphates, manipulated guanos, &c.,—I think they will be found considerably below. Still, for some purposes, they are useful at the prices at which they are sold, and they will continue to be bought. But the price should be as nearly as possible what the farmer can get an equivalent for, and, with the almost unlimited supply of guano, he must study carefully before he invests largely in those manures which will supply phosphates in a more soluble form than the guano, and which, from their mechanical condition and solubility, perhaps, are a little more valuable for certain crops.

A chemical analysis by a competent chemist is rather costly. If a man is about to purchase a ton or two of manure, he can hardly afford to pay twenty-five dollars to have an analysis made for himself. He cannot trust the analysis made by the vendor —that is certain. He ought, then, to be able to turn for his information to his agricultural society, to the board of agriculture in the State, or to some disinterested body, of which he himself should be a member, perhaps, or in which he should be sufficiently interested to pay in his just share of the expenses, for the information which he much needs. It is, however, for the interest of every State that their farmers should have this information—that their markets should be narrowly watched, so that the vendors of these fraudulent manures, or manures sold at very much more than their real value, shall not dare to put such manures into the market.

Referring again to these analyses which were made in Connecticut a few years ago, and in which, at the time, I was interested, the effects seen there were very remarkable. Having collected a number of the manures which were at that time analyzed, and publishing, as I did, the journal in which these analyses were published, I can speak with a knowledge of the facts. Almost immediately after the publication of these analyses, and so soon as it was fairly known throughout the community by the vendors that their manures were liable to be picked up and subjected to the crucible of a disinterested chemist, it was difficult to find very poor manures. At first they were easily enough found. There was no end to the manures which were absolute frauds upon the farmer; the trouble was to find those which were not. But the quality improved very much, so that after a while it really seemed as though the makers of those manures were doing their best to put upon the market a fair article, at a fair price. Although their prices were a little higher than we could figure, according to the standard which I have laid down, (which at that time was considerably lower than the standard which I have just named to you, of twenty cents for ammonia, and five cents for insoluble phosphoric acid, and fourteen cents for soluble,) nevertheless, the gain to the farmers was very great. It was so great that, after those facts were published, it has always seemed a wonder to me that every State in the Union, or every influential agricultural society, has not employed some competent chemist, and kept in this way a thorough look-out upon the manure market, and so prevented these frauds.

I have a memorandum of the prices at which manures of very fair value may be obtained in the city of New York, and will name them. Peruvian guano, in quantities of fifty tons, may be bought of the government agent at the rate of sixty-two dollars and fifty cents in gold, per long ton, or about ninety dollars in currency. Phosphatic guanos vary in their composition very much. Some of the best, containing from sixty to seventy per cent. of bone phosphates in a ton of two thousand pounds, may be bought for about forty-five dollars. Superphosphate of lime, which is a compound manure, as you are aware, containing but a small quantity, really, of superphosphate,—that is, the soluble phosphate of lime,—may be bought for about fifty-five dollars. That is a fair price. Fine-ground bones for about forty-five dollars. Flour of bone, a manure which has been quite extensively sold within the past two or three years, at about sixty dollars a ton, is not now in the market, owing to the burning of the mills where it was chiefly made. Still, there are manures of the same name, "flour of bone," not equalling that in quality, by any means, which are sold at about the same price. Fish manures, the product of the oil-fisheries on our coast, and a very valuable product, coming more and more into use by farmers as it is better known, sell at about forty-five dollars per ton; that which is ground (a little higher this year) and that which is not ground at prices varying from thirty dollars to forty dollars. It varies considerably in composition; but it is all valuable, and most of it sells at a price making it very nearly as cheap as Peruvian guano. For many purposes it is a better manure for the farmer than guano, especially when composted with muck, or something of that kind. Beef scraps may be employed as manure with advantage. They contain about thirteen per cent. of ammonia, and are worth about fifty dollars a ton. They sell at two and a half cents a pound. Castor pummice, the residuum after pressing out the castor-oil from the bean, is another valuable manure, obtainable, however, only in small quantities. Still, it is very useful, especially as it drives away mould. Then a manure or salts yielding nitrogen, nitrate of soda, or Chili saltpetre, sells at six cents a pound; sulphate of ammonia, eight and a half cents; sal ammonia, about fourteen cents a pound. These may be had. They are all available sources of manure; but they are seldom sold so low that they pay, in comparison with Peruvian guano.

The number of manures which are offered in the market, which the farmer has his choice among, is exceedingly great. I have a package with me, which I collected in a very short time, perhaps an hour, in running about in the city, and a few memoranda, made by looking over a few papers, collected very easily, and representing but a very small portion of the manures in the market, which would be very interesting if I had time to spread them before you. Their claims, in many cases, are exceedingly modest, when you examine simply their analyses; but when the certificates of the farmers who have used them, and the actual claims of the vendors, are taken, they are anything but modest. One firm advertise, for instance, that they are "the owners of the Guano Islands, whence their supply is derived" It may be that they do own some guano islands, from which they draw something; and it may be true that they own the guano islands from which their supply is derived; but there is the statement that they are *the owners of the Guano Islands!* It is not published in the Northern papers. I find that statement in Southern papers, and that advertisement circulates through a very large part of the Southern press. I merely mention this as a sample of the manner in which they attempt to deceive ignorant farmers. Their claims are such, however, that they deceive the most intelligent farmers, and they have among their recommendations the names of the very first farmers in the country. The first farmers in this State have given their names, in some cases wording their certificates very carefully, in others merely approving what they have bought, but given in such a way that they are used by the vendors, and create very wrong impressions. The only perfectly safe way for a farmer to do is to give no certificate at all of the practical value of manure. He is no judge, the best farmer in the country is no judge, by one or two experiments, of the value of a manure. He knows its value to himself, upon his own farm; he knows where he has laid out a dollar he has got back two; but that is no proof that his neighbor, who has a farm of a very different character, will have the same results; and even if the probabilities are very much in favor of such a result, nevertheless, it is no test of the real value of the manure. The man asks sixty dollars a ton for something which is worth twenty dollars. The farmer applies it, is well satisfied with the results, and he recommends it in such a way that a thousand of the farmers of his State and adjoining States are induced to invest their money in an article which they might buy a great deal cheaper in some other form. That is not right. The great reliance of the dealers in fradulent manures, and the honest dealers, also, in good manures, is in the certificates they obtain from distinguished agriculturists. These certificates, as I have said, ought to be given, if at all, with great caution. In the English agricultural papers, and in the circulars of the dealers in fertilizers in England, I have noticed of late very few certificates of that kind. Their certificates are those of well known chemists, and that ought to be the class of certificates depended upon by dealers here.

I will not trespass further upon your time than to mention this fact. The market for commercial fertilizers is not in New

England, it is not in New York, it is not where the best farming is done in the United States; it is where the poorest farming has been done, whatever may be the case now. On the contrary, in Europe, the market for commercial fertilizers is where the best farming is done. The best farmer is the one who can best afford to pay for commercial fertilizers, and he is really the only one who ought to buy ammonia, because the ammonia ought not to be used except where there is an abundance of phosphates, alkalies, and the ashy ingredients of bones; and that state of things rarely exists upon any but good farms, or virgin soils; and, consequently, I infer that the time is coming when a very great and constantly increasing market for these things will be found in New England and New York among the very best farmers. The fact that our home sources of supply are not yet exhausted, that the prices seem high, and farmers are cautious, is the only reason why there are not more fertilizers employed, I presume.

With this imperfect introduction of the subject of commercial fertilizers, I will leave it with the audience.

The CHAIRMAN. Gentlemen, the question of the value of commercial fertilizers having been opened by Col. Weld, is now before you for general discussion. It is a subject of very great importance to every cultivator of the soil, and I see before me an unusually large number of gentlemen skilled in agricultural science. I hope the time that remains to us of the morning will be fully occupied. I will call upon Col. Clark to favor us with any suggestions he may have.

President CLARK. I am one of those who believe in commercial fertilizers, and that, as Col. Weld has said, the best farming demands commercial fertilizers. I believe that commercial fertilizers pay best where there is the most intelligence. I am also one of those who believe that there is an immense amount of wealth in the earth and in the ocean stored up, and not yet much distributed, for the benefit of man, when this earth shall be properly cultivated, when farmers have education, and when they begin to work intelligently, and use the resources of the land, the sea and the air in the best manner. I have, therefore, a great deal of faith in the education of farmers, because I know that, if knowledge is valuable anywhere, it is in so complicated an art as agriculture; and because I know that, if knowledge can be made to pay anywhere, it is where such a great variety of material can be turned into money as can be on the farm and in the garden.

Now, this matter of commercial fertilizers rests chiefly upon certain mineral products,—things which have been prepared by the Creator in ages past, and which are to be collected and converted into plant-food; and I am one of those who believe that all this talk about "progressed phosphates," &c., is nonsense. I believe that mineral phosphates, taken by the chemist and put into solution, or put into the form of soluble superphosphates, are just as good as a phosphate that has been forty times through the laboratory of life; and I do not believe that we know yet that there is any phosphate in the earth that has not been "progressed." Prof. Agassiz can tell better than I can about that. But the fact is, what we want in regard to phosphorus and phosphoric acid is enough of the phosphate.

Now, I am one of those who believe that the treasures which are necessary for man in his highest development, in his highest degree of civilization, when the earth is populated more densely than it is anywhere to-day—I believe that those treasures are in the earth, and are to be brought forth as gold was in California when wanted, as petroleum was in Pennsylvania when wanted, as they have just discovered in Germany, at Stassfurth, a wonderful deposit, as of the boiling down of an ocean, leaving a mineral deposit which will enrich all the continent—twenty-five miles square and twelve hundred feet thick. At the bottom, the least soluble part, is sulphate of lime; above that, a thousand feet of rock-salt; above that, sulphate of magnesia and sulphate of soda; and above that, a hundred feet, more or less, of the chloride of magnesium, chloride of calcium, and chloride of potassium. Here is a supply of mineral wealth enough to last the whole continent for centuries. They are just beginning to dig it out. It has hardly yet worked its way into the market. There may be some gentlemen here who know something about the alkaline manures made in Cambridge by Dr. B. A. Gould, who has imported some of this article, prepared it for market, and offered it for sale. It is chiefly chloride of potassium and sulphate of potash. It is an alkaline manure, so called. It furnishes potassium chiefly. This is made out of the products of this mineral bed; and I believe that chemistry is to evolve out of that mineral deposit an immense mine of wealth for the agriculture, not only of this country, but of all countries where science is applied to that branch of industry.

But I rose particularly this morning to call attention to a more wonderful discovery in this country than that at Stassfurth. It was said, years ago, by Prof. Liebig, that we had a supply of phosphates for only twenty years in all the world; that the guano islands would soon be stripped, and then where were we to look for phosphates? That has been the great problem for those who have looked for the future progress of agriculture. There is a limit to the number of guano or bird islands, and the question was, what should we do? They talked about phosphatic minerals. Where? Why, there have been found small deposits of phosphate of lime, very hard and difficult of solution, in Spain, England and Canada, but furnishing no adequate supply for the future. Now we are to supply the world with phosphates, and the world may thank the Yankees of these United States of America, (it is all Yankee now clear down to the Gulf; the Yankees have marched over it and left their footprints that will never be wiped out;) the world, I say, may thank the Yankees for the very thing I have to reveal here today. It is only since the war, and since Northern capital has gone to work at the South, that this discovery has been fairly developed.

Now the announcement which I have to make is this. That there has been discovered in South Carolina a bed of phosphate of lime, the origin of which the wisest geologists have as yet been unable to discover, which contains, after it has been roasted and ground to a fine powder, seventy-five per cent. of phosphates, easily dissolved in sulphuric acid and converted into superphosphates. The quantity there is absolutely inexhaustible. The whole world may come to Charleston and run their ships up the Ashley and Cooper Rivers and take in cargoes of the phosphate anywhere along the banks. There are hundreds of tons to the acre over just as many acres as you please to travel.

I compare that, as a discovery for the interests of agriculture, with the discovery of petroleum for enlightening the world. It is of the same sort, and this mineral will be utilized and will be of immense benefit to mankind. In order that you may have the exact facts, I propose, with your permission, Mr. Chairman, to read a short statement, which I have requested a friend of mine, resident in South Carolina, to prepare, in regard to this matter; and I have here some specimens of the phosphate as dug up. There are two kinds, as you will see by the description which I will read. The writer is a very intelligent young man—Prof. C. U. Shepard, Jr., M.D.,—who is not only a graduate of Amherst College, but of a German university also, and who knows whereof he affirms:—

"It is an erroneous opinion that the discovery of the beds of nodular phosphates is a recent one, as has been stated in the newspapers. That the marl contained phosphate of lime was mentioned by Tuomey in his geological report as far back as 1850, although he had no idea of the extent of the beds nor of the high percentage of phosphates. Prof. Shepard, of the South Carolina Medical College, was the first to become aware of its existence and value as a fertilizer, and urged the importance of the subject upon the agricultural society of South Carolina, at a meeting of the same, a few years before the commencement of the secession movement. In 1860, in company with Col. Hatch, he commenced operations for manipulating these deposits, with every prospect of success; but the breaking out of hostilities put an end to the work. After the close of the war attempts were made to put the old plans into execution, but they all failed, until, through the energy of Dr. Pratt and Prof. Holmes, of Charleston, the attention of Northern capitalists was directed to the high percentage of the phosphates and their extent. It was supposed, a year ago, that the phosphates, if not confined to the beds of the Ashley River, in the neighborhood of Charleston, were still to be found there nearest the surface, of higher percentage and in closest proximity to transportation by water. Companies were formed, which sought to buy up all the land on the banks of the river and extending as far back from the same as there was any probability of finding it. At that time the phosphatic beds were thought to extend from the Santee across to the Cooper River in a southerly direction, but as the beds were irregular and generally down deeper than in other quarters, but little attention was paid to them. A few beds were found along the banks of the Cooper River which had a very high percentage of phosphate of lime, but lay rather too deep for successful mining, (from six to twelve feet on the average from the surface.) At various distances from Charleston beds of phosphate were found on the peninsula formed by the Cooper and Ashley Rivers. As a rule, this belonged to the softer kind of phosphatic marl; the nodules were of a lighter color and contained more sand than the others. For an analysis of one of the best samples from this vicinity, see below. The best beds lay at an average depth of eighteen inches from the surface; the nodules were from the size of a boy's fist to that of a man's head; the depth of the stratum from twelve to eighteen inches. Some such beds extended over hundreds of acres. This kind of phosphate appears to be very promising, not only on account of its high percentage of phosphate of lime, but also on account of the ease with which it may be crushed to a powder.

Analysis of a soft nodular phosphate from between the Cooper and Ashley Rivers.

	Per cent.
Amount of moisture, expelled at 212° F.,	3.04
Water and organic matter,	6.03
Sand and sesqui oxide of iron,	12.83
Carbonate of lime,	8.06
Sulphate of lime,	2.2
Phosphate of lime and iron,	69.00

"The phosphate of iron rarely exceeded five per cent., and was much less in these light colored phosphates. The masses were not very irregular in form.

"The chief beds were discovered on the Ashley River, extending from about seven miles above Charleston up the river for ten to fifteen miles. The land is not level, but rolls in low bluffs, generally twenty to forty feet high, at right angles to the course of the river. Between these bluffs there are swamp lands, most of which have canals through them, and were once thoroughly drained for the culture of cotton. In these low lands the rich top soil is about four to six inches in depth; then follows a light, sandy stratum, sometimes eighteen inches thick, generally less; and underneath, the stratum of nodular phosphates, packed close together with hardly any soil between them. The average size is about that of a man's fist; the surface of the nodules is very irregular, with holes running deep into them, sometimes entirely through (formed by the borings of the teredo.)

"These nodules are compact, very hard, sometimes brown in color; when dug up, very much of the mud adheres to them. If two fresh surfaces of fracture be rubbed together, a very strong organic odor is evolved, which is so characteristic that this is used as a means of detecting the phosphates throughout the region. The odor is obtained from the dry as well as the wet, from the hard and soft varieties. The amount of nitrogenous, organic matter is small, not exceeding 0.5 per cent. for ammonia. On the bluffs the strata are much like those described above; but the sandy soil is apt to be deeper, which places the stratum of nodular phosphates deeper.

"Underneath these strata is a bed of phosphatic marl, which rises in some bluffs thirty to forty feet above the surface of the river, and which descends to a depth of several hundred feet. This was penetrated by the boring of the Charleston artesian well for three or four hundred feet. An analysis of this phosphatic marl from a bluff on the Ashley River, gave the following:—

	Per cent.
Water and organic matter, ...	8.00
Carbonate of lime, ...	54.54
Sand and iron, ...	20.00
Phosphate of lime, ...	14.00
Alumina, ...	2.00

"The marl is in a fine condition, and can be obtained in immense quantities at trifling cost and labor.

"The nodular phosphates from these beds vary but slightly, except that some of them have a higher percentage of iron or of sand than the others.

Analysis of a Nodular Phosphate from the Ashley, some fifteen miles from Charleston.

	Per cent.
Moisture, water and organic matter, ...	6.00
Sand and oxide of iron, ...	15.3
Sesqui oxide of iron alone, ...	5.4

Carbonate of lime,	6.24
Sulphate of lime,	5.75
Phosphate of lime,	63.21
Phosphate of iron,	5.3

"The phosphatic nodules lie so close to one another that the amount produced from the best land appears incredible. Where the stratum is fifteen to eighteen inches in thickness, the actual yield exceeds, in some cases, 1,300 tons to the acre; and much is wasted, the smallest lumps being neglected entirely.

"The mining of the deposits is easy, requiring only the digging a trench and picking out the nodules with a pick, the nodules being thrown into carts, placed on railways in some cases, the loose earth being thrown to the rear. The phosphates are brought to the river-bank, washed in large cylinders (and this is easily accomplished by a rotating motion which, with the running water, frees the nodules from the dirt attached to them.) Vessels can come up to the banks of the river and load there; the river admits as large vessels as can cross Charleston bar. Since my departure from Charleston, in fact before then, extensive discoveries had been made to the south and south-west of Charleston; large beds of fine phosphates have been discovered, and speculators were buying up land on every side at prices averaging at ten dollars an acre. It has been written to me that solid beds of phosphatic rock have been found, of large extent and more than two feet in thickness. The whole country is so cut up by rivers and bays that it will be a comparatively easy matter to bring the stuff to market.

"The raw phosphates, clean and dry, were said to bring about fifteen dollars a ton in Philadelphia last winter. This appears to me too high, especially if labor continues to be as abundant as it is in the South, and the extent of the deposit so great. A man can dig, under favorable circumstances, half a ton a day, and be hired for less than a dollar a day (with food and shelter furnished besides.) Irishmen have been employed during the winter months. They do not work steadily, however; and white labor is impossible during the summer months in these unhealthy localities. The negroes, when left to themselves, work well, and can continue their labor through the entire summer with impunity. It is a good practice to pay them off regularly every week, which makes them happy and disposed to begin the following one again.

"It is thought that these beds will be important, not only for American agriculture, but also for European, more particularly for England. The phosphates can be sent over as ballast on the cotton-ships, which formerly were obliged to bring their ballast with them for their return voyage, since there was no ballast to be found in the neighborhood of Charleston. No doubt the material will be treated in various ways. One very simple method is to roast the nodules over a fire of logs, (as some varieties of iron ore are roasted,) and then to grind it to powder; or to apply the higher heat of an oven or lime-kiln; this leaves a mass which grinds up very easily.

Comparative Analysis of Phosphates before and after heating.

	Before roasting, per cent.	After roasting, per cent.
Water and organic matter, . .	4.61	–
Carbonate of lime, ...	11.20	–
Sand and sesquioxide of iron, . .	8.69	sand, . . 5.3 oxide of iron, 3.75
Sulphate of lime, ...	4.27	5.38
Phosphate of lime and iron, . .	69.32	76.75
Free lime, ...	–	7.14

"It will be observed that the application has driven off the water, organic matter, and the carbonic acid of the carbonate of lime, setting the lime free. This has raised the other percentages accordingly. This process of heating would be comparatively cheap in a country where fuel is so abundant, the pine-trees standing over the beds of phosphates. In this condition it could be transported very easily, and ought to bring fifteen dollars a ton, which would yield a handsome profit I think.

"The nodular phosphate has been treated with sulphuric acid to form superphosphates. It is converted into such at a small cost; i. e., into fertilizers which contain ten to fifteen per cent. soluble phosphate of lime—all that is really necessary. Such fertilizers ought to sell readily at forty dollars a ton, which would yield a fine profit. After treatment with acid the fertilizers dry readily, in spite of the small percentage of iron, which, it was predicted, would interfere with the drying. Patents have been given for treating the phosphates, when hot, with brine and the liquor obtained from gas-works, to which sulphuric acid has been added. The reactions which take place when the phosphate has been heated, and when treated with concentrated brine, have not been fully studied; but it appears as if the phosphate of lime and the silica were put in a form where they can be more easily seized hold of by the plant.

"Such fertilizers, containing such large quantities of phosphate of lime, and other lime salts, must prove of great value to our agriculture, and, if ammoniacal matter be added, will be just what the planter of the South and the farmer of the North needs. At some future day the immense deposits of phosphatic marl of the great South Carolina marl-beds will be used for agricultural purposes. This contains, on an average, ten per cent. of phosphate of lime, and when roasted would prove of great value as a fertilizer for farms which need lime. At present there must be at least half a dozen companies in Charleston which propose mining these phosphates. Some have abundant means; others hardly anything beyond a name, officers and lands. Many of the Northern manufacturers of fertilizers have bought land, or made contracts for the raw material. As yet but little is manufactured on the spot, the larger portion being sent to the North for manipulation.

"Fertilizers which have been made of this material have been successful this season, as I hear by letter."

This paper has just been received, and this is an entirely new thing. It is proposed to obtain samples of this material in the raw state, and also roasted and ground, and make some experiments with it upon the college farm; and, moreover, to prepare with acids, and in other ways, specimens of the phosphatic rock, and experiment with them. As we are to have a gentleman to take charge of this subject of agricultural chemistry, in the college, who cannot be surpassed in skill, talent and genius in this matter, I predict valuable results for the farmers of Massachusetts.

Prof. AGASSIZ. I wish to say a few words upon the subject to which President Clark has alluded, which is, perhaps, of greater importance than might be supposed at first sight.

I have seen and known something of these deposits of lime in South Carolina. Some fifteen or eighteen years ago, when delivering some lectures in the medical school in Charleston, I saw some specimens of this phosphate of lime, which, however, was not considered of much importance then; and it is perhaps well that it should be understood why, because, otherwise, the fact that no application of it has been made might raise a prejudice against it. This article, known so long, has acquired importance only recently. When it was found, it was found in connection with the Charleston marl. At that time, there was a gentleman greatly interested in the progress of agriculture in the Southern States, Mr. Ruskin, who advocated manuring with marl. That gentleman had great influence all over the South, and he brought the Charleston marl into such credit it drove every other consideration out of thought. Marl was the manure then, and it prevented any experiment with the new article; and I have no doubt that Mr. Ruskin, while he introduced a very valuable manure into the agricultural districts of the South, prevented an appreciation of this deposit, which was known eighteen years ago.

This deposit, as a geological deposit, is of great interest, because we have nowhere else in the world anything like it. It is of very recent origin, and rests upon marls. It is a very superficial deposit. I have no very decided opinion to express about it, but only a suggestion to make. All over the southern parts of South America, in the pampas, especially in the Argentine Republic, there are deposits of very recent geological formation, which have been known for half a century to scientific men, containing an immense amount of fossil remains—bones. The museum at Buenos Ayres contains a vast amount of these curious relics, all of them belonging to extinct races. A few of them have been sent to Europe, and have been the objects of admiration for their perfection. Now, these deposits are so full of these bones that if they had become decomposed they would have formed sulphate of lime similar to this South Carolina deposit. A few bones are found in this phosphate of lime, which are the bones of extinct animals, also, and I should not be surprised if the progress of discovery should show that the phosphate of lime bed in South Carolina is equivalent to those of South America, and that the phosphate itself is the result of the decomposed bones, which, in the South, are preserved, to give us an idea of what were the animals of those times. That is all I can surmise concerning the origin of that vast deposit, and there is such a similarity between the superficial deposits of South America and North America, that I think this is probable. I have lately made an examination of our prairie, of which I shall perhaps say something this evening in my lecture, and have had an opportunity to compare it with the deposits of the Amazon, and the similarity is so surprising, that this, to my mind, is an additional reason for believing that the deposits of South Carolina will prove similar to those of the Argentine Republic, and thus give a clew to this very curious material.

I will avail myself of this opportunity to make a few remarks which were suggested by what was said by the first speaker this morning, who alluded to the importance of manuring and the use of mercantile manures, and to the method of securing farmers from imposition and affording them proper information on the subject. I take this opportunity to express my opinion of the importance of this college. The members of the State Board of Agriculture well know that I have been one of those who had no faith in an agricultural college. I have done all I could to prevent its organization. I am glad I did not succeed. But, gentlemen, my opposition arose from this: that I have seen too much of these scattered efforts to do everything at every place. I have become so well satisfied that we have a great many too many institutions of the same character, that I was apprehensive that the organization of an agricultural college would end in giving us another college of no great importance; and if it had ended in that way, we should really have lost an important means, which might have been usefully applied; for we have already five colleges, and if the Agricultural College had been only another school similar to the colleges already in existence, we should have had six, and we should have had nothing of any very special importance. It seemed to me that the plans which were discussed in the beginning tended to the organization of another college under the name of the Agricultural College, but where the Agricultural College would be an excuse and not a real thing. That was the chief ground of my opposition. I thought that if all the educational resources which are at the command of the State should be united in one great institution, we might do better for the community. But circumstances have led to the organization of this college in such a way that the original plans have passed through a series of modifications, and it is now on such a footing that it has assumed a very different aspect from what it promised at first. I have seen to-day what has been done within a year and I have been astonished. I have been astonished to see that this institution begins to assume a character of its own—not to be a mere imitation of what we had before; that it begins to assume the character of an agricultural college; and if it is carried on in the way in which it is now moving, it will really end in being an agricultural college, with all the features that an institution of that kind ought to have, and distinguished from anything we have elsewhere. But to secure that result, there ought to be several things done which are only proposed or partially accomplished. Now there is to be a professor of agricultural chemistry. That is a very important step; but why should you stop there? Why should not all those interested in agricultural pursuits urge the appointment of several professors of agriculture? No one man can do the whole work which is to be done there. There ought to be investigations in agricultural chemistry all the world over, employing numberless able investigators. We have now only a few of them in this country, and a well-conducted agricultural college should have several, who should take hold of the different branches of agricultural chemistry and carry them to such perfection that their work should help in advancing the knowledge of agricultural chemistry, and in furnishing the farmers throughout the State that information concerning the value of their soil and the nature of the manures they employ which they absolutely need. If we had these several professors we should have such a number of pupils that all the analyses needed by farmers could be made in the school; and, gentlemen, let me say that if you have but one professor he will be so occupied all the year round in teaching, that he will not be able to make any original researches. It is one of the great mistakes of our learned institutions that the professors, or those connected with instruction, are overloaded with a variety of duties, which prevents them from doing any one well. But we have an example already in the right direction. There is one university in the United States, two months old, the organization of which is superior to all those that have existed before. It is the Cornell University, at Ithaca, in the State of New York. That institution went into operation on the 9th of October of this year, and it begins with two professors of chemistry, each one with an assistant, and within six months a third professor is to be appointed, with an assistant also. It has a laboratory larger than that at Harvard, larger than that at Columbia College, and it will have, this term, one hundred and twelve students entered for work in the chemical laboratory. The chemical instruction, (I speak of that only; many other departments are as well organized as that;) is divided into the general department, the agricultural department and the manufacturing department; and each one of the three professors will have his independent laboratory and his private assistant to conduct the work, so that the students shall not only have the advantage of the extensive instruction which the professor can give, but be allowed to work in the laboratory and learn to do themselves what they are taught. Now I say that you should at once insist that in your Agricultural College there should be more than one professor of chemistry, and that the different branches of agricultural chemistry should be in the hands of independent professors, so that each professor should have some time to make investigations by which he will advance the general knowledge of his special department; for, believe me, the professor who is exhausted by teaching cannot even learn what others do to keep up with the times, still less contribute to the advancement of knowledge in his science; and if he is not in a position to contribute in that way to the progress of his own department, he falls behind, the institution falls behind, and, with this, the whole standard on the subject among us.

Now I think that the management of the Agricultural College, within the more recent period of its existence, has been such as to promise a success; and if you would put your shoulders together and urge the organization of the college on that comprehensive plan which will shut out from it all that is not really within its own sphere, and insist that that which belongs to its sphere shall be of the best and amply provided for, then you may look for complete success.

Mr. Clift. I think I may say, in the light of the discussion we have had upon the subject of commercial fertilizers, that the State of Massachusetts will be fully justified in giving to Prof. Clark all that he wants to carry out his plan of an agricultural college. Our good farmers throughout New England are a very prudent class of men, and they want to see beforehand that a thing is going to pay before they embark their dollars in it. I do not blame them. They have to work to get their dollars, they come honestly by them, and when they make an investment they want to see that they are going to get their money back again. Now in this very item of commercial fertilizers Massachusetts is going to get back all she invests in this Agricultural College. If this college gives to the State a competent agricultural chemist, who will tell the farmers just what they are buying, Massachusetts will get back, every year, on these commercial fertilizers, all that she has invested. There is no class in the community that is so robbed and plundered and sponged as our farmers are by these manufacturers of commercial fertilizers. I will tell you how the thing is done. They want to get up a manure that will sell for $45 a ton. That is what a good superphosphate or Peruvian guano ought to sell for—that is what it is worth to the farmer. They will buy up fish guano for $20 a ton, and then mix it with charcoal, and make a manure for $25 a ton, which they sell for $45, and make a clear profit of $20 a ton, which comes out of the pockets of the farmers. The farmers of New England and the country are robbed of millions of dollars a year by just this process. Now if we have these commercial fertilizers analyzed, and farmers are satisfied that there is only $25 worth of superphosphate, or whatever is valuable in the manure, they will not pay $45 a ton for it. This is what is wanted—the protection of farmers by these analyses. This is what this college is going to give you; and I hope that when President Clark comes for his endowment of this college—especially of this professorship of chemistry—the farmers of the State, through their legislature, will see that he has what he wants, for it is an investment that is going to pay—pay largely.

T. S. Gold, of Connecticut. I would add my testimony to the statement of Col. Weld, with regard to the effect of the analyses conducted in Connecticut a few years since by Prof. Johnson. I was familiar with the results of those analyses at that time, and I am a member of the board of agriculture in Connecticut at the present time. We were so fully satisfied of the value of those analyses, that Prof. Johnson is now employed upon a similar series of examinations. I am collecting from the dealers in Connecticut, wherever they offer these fertilizers for sale, samples taken directly from their boxes and barrels, which I place in the hands of Prof. Johnson for analysis. The results of our former operations were such as described by Col. Weld. We found the fertilizers very poor at first, but they improved rapidly under the system we adopted. When the dealers found that their goods were liable to be analyzed by samples taken from the shops, and analyzed by a chemist of such reputation as Prof. Johnson, they immediately put in the market a class of goods that would bear the test. That is what we are seeking to attain again.

Col. Wilder. I wish to say to the audience that no measure within my day has been of more importance than these analyses of special manures by Prof. Johnson, because, as was intimated by the orator who has spoken to-day, it immediately corrected the evil, so that it was impossible at the moment to buy a manure which was not a tolerably honest one. I well remember those analyses. Prof. Johnson was furnished with various samples from the barrels and boxes of the vendors, and kept a record of his examinations for several years. At last he promulgated the fact that a certain phosphate of lime which was selling in New York for $55 a ton cost $57.50. Of course that gave it great popularity. It was very effectual and became very popular. But that same manufacturer put into the market an article, under the same name and with the same brand, which, tested by the same analysis, cost but $7 ! Am I right, Mr. Gold, or does my memory fail me ?

Mr. Gold. I think you are not far out of the way, but Col. Weld is more familiar with that matter than I am.

Col. Weld. I think you are right.

Col. Wilder. I could go through with this list, for it is all fresh in my mind, although the circumstances occurred so many years since, but I will not detain you. It illustrates, however, the importance of an examination of these articles by some institution like our Agricultural College, or by some authority under the State in which these manures are sold.

While I am up, Mr. President, my friend, the president of the college, Col. Clark, desires me to present to the audience a specimen of soil which I brought from the Johannisberg vineyard, so popular for its wine; and I take great pleasure in doing so at a moment when our distinguished friend, Prof. Agassiz, is present, who can give you more information on the subject than I possess.

I wish here to say, lest some misapprehension may have been created by some remarks I made last evening, to the effect that the grape mania had produced a glut of vines, so that the sale was dull and there was a lull at this time, that I did not wish to have it understood that we had passed even the threshold in planting grounds which are suitable for the growth of the vine, or in supplying the population of the United States with grapes. We have but just begun.

I alluded yesterday to the visit I had made to the West, and to the soils on the banks of the rivers, but I saw none like this Johannisberg soil, so famous for making the best wine in the world. It is so hard that the surface cannot be broken up except with a heavy-pronged hoe. So tenacious is it, that I allowed this piece to fall in the cars, and it did not break it. This is the surface soil at Johannisberg. It seemed like baked clay, only broken a little here and there to let in the atmosphere by the pronged hoe; and yet it produces the finest wine in the world. Now I will call upon the Professor to tell us what the characteristics of that soil are.

Prof. Agassiz. About the soil of Johannisberg, I really know nothing. I believe that in that region there is a good deal of volcanic ashes, which are probably the essential foundation for the fertility of the vineyards.

But, gentlemen, I would like to say a few words more concerning the chemical professorship which is to be connected with this Agricultural College. I do not know the gentleman who has been appointed to fill that place, personally, but I know of his work as a scientific chemist. I do not believe that you could have had a better appointment. I believe that the gentleman is not only fully competent to fulfil his duties with honor to the institution and credit to himself, but I believe he is one of those men who will advance his science also, if he is not overburdened with local duties and with teaching. One word more about it. He is a foreigner. He has received his teaching abroad, and that may cause a prejudice against him, for we are apt to think that it would be wiser, when we organize a new department in our schools, to take some one of our young men, educate him, and put him in the place. No doubt, in many cases, that would be a wise course ; but, by so doing, you retard your harvest by so many years. If you take up a young man now, and educate him to become the agricultural chemist in your college, you must give him five, six or seven years' instruction ; and during that whole time, your pupils will have nothing in that special department, your institution is not progressing ; in fact, as I said, you retard your harvest by that much. Take a competent man wherever you can find him. Whether a native-born or foreign-born citizen, or whether he be no citizen at all, if he is competent to teach chemistry well, have him. He will educate pupils in as short a time as you can educate them to be agricultural chemists, and thus provide professors for the other agricultural colleges which are springing up like mushrooms all over the country. Your college will then not only provide your own agricultural chemists, but will be the nursery of chemists for other institutions. It is not a very dangerous thing to take professors from foreign parts. I am such an one, and I have in a measure succeeded in making myself a native American.

Col. **Wilder.** In regard to the Johannisberg wine, which has been alluded to, I ought to say that at Johannisberg, as everywhere else, there are found little nooks and corners where grapes and other fruits succeed better than elsewhere. The Johannisberg estate comprises only fifty or sixty acres, and but a small portion of it produces this very remarkable wine. On the low lands, where grains and vegetables will grow, the wine is very poor. While the wine produced from the low lands will bring only half a dollar a bottle, or two or three shillings sterling, the best wines, which are made from those choice nooks and corners,—sheltered places, high, dry, sunny locations,—sell for thirty shillings a bottle. The price of the wine which I brought home was thirty shillings a bottle, in gold. I believe it is sold only to the Emperor Napoleon, the Emperor of Russia, and the Duke of Cambridge. Very few have an opportunity to buy it. There is that difference in soil everywhere in relation to its products. So it is with regard to the grape. We shall find yet, in our own country, choice locations where we may produce the Tokay, the Johannisberg, the Château Margaux, and other wines of superior quality. But the point is this: we must seek out for every fruit the appropriate soil and situation.

On motion of President CLARK, the Board adjourned, to meet at 2 P. M.

AFTERNOON SESSION.

The Board met according to adjournment, and a lecture was delivered by JOHN GAMGEE, Veterinary Surgeon, and President of the Albert Veterinary College, London, upon

THE PRINCIPLES INVOLVED IN THE PRESERVATION OF MEATS.

There are not many industrial pursuits in which men embark with less knowledge of the fundamental principles involved in their operations than in that of curing meats. Ten or twenty years hence meat-packers will look back with amazement at the improvements introduced into their business from say 1850 to their time; and what has been done during the past eighteen years, even including the successful introduction of Professor Liebig's extract-of-meat process, will seem as nothing compared to the greater revolutions of the next decade. It is a dangerous game to play at being a prophet. But I do not predict anything more than scientific men generally can infer from the progress of accurate knowledge.

What have we known hitherto of the process of decay or putrefaction? Before the days of Pasteur this field of inquiry was in chaos. This French philosopher has surprised the world by the simplicity of his experiments, the nature of the results he has obtained, and the comprehensiveness of his generalizations; and, in spite of the struggles for life and distinction on the part of the advocates of spontaneous generation, Pasteur must vanquish and leave an impress on the annals of discovery which time cannot efface. From the earliest days when I studied physiology in London it appeared to me that the theory of spontaneous generation would soon find its resting-place in oblivion. At that time nothing could be more unsatisfactory than the state of knowledge regarding the origin of many parasites and the development of contagious diseases. But these subjects engrossed my attention when engaged in a prolonged continental tour, visiting medical and veterinary institutions. Küchenmeister, Van Beneden, Von Siebold, Haubner, Leuckart, Esebricht, Ercolani, Baillet, and numerous others, were then, and have since been, at work explaining the strange metamorphoses which invest the lives of entozoa. The opposition which retards the dissemination of truth was rarely better illustrated than by the manner in which demonstrations of the methods of transmission of parasites were received by farmers, and even veterinarians, in Scotland. Dogs were artificially infested with tapeworms, and these were transmitted to sheep, which soon showed symptoms of cerebral torment from the growing bladder-worms, no doubt often probing the sensorium with their erectile heads. Many of the canny Scots reputed me insane and an enthusiast. They thought worse still of me when I insisted on the dangers and irretrievable losses incurred by a traffic in diseased animals alive and dead. But my efforts as a veterinary teacher were from the commencement directed to the complete overthrow of old-established doctrines and practice in relation to cattle plagues; and although, even at the present day, few of the most advanced European veterinarians venture as far as I have done, I know that the most careful experiments and observations will complete the demonstration of a truth which bears an intimate relation to the subject of this lecture. Epizootics of contagious nature exist which are transmitted through time and space by reproduction of a contagium or virus, and are incapable of spontaneous development. This class of diseases is well defined, and the protection of farm-stock from their ravages rests on the complete understanding of that simple law. It is as impossible to have the spontaneous development of a case of lung plague, rinderpest, foot and mouth disease, hydrophobia or smallpox, as it is to have a man born out of nothing; and it was the enunciation of such a doctrine that led the "London

Times" to say, in 1865, that I was as irrepressible as the cattle-plague itself. I trust to merit the honor of such an encomium on all occasions whensoever or wheresoever the cause of truth finds in me an humble exponent and defender.

But to return to the theory of spontaneous generation. It was assumed by many thinking men until recently that organic products, complex in their structure and chemical constitution, had an inherent tendency to resolve themselves into simpler compounds, and that the affinity which held the elements together in life was lost at once and forever in death; that the rapidity of these *post mortem* changes might be checked, and that modifications in the results of ordinary decompositions might be obtained. The air which, on the one hand, is known to sustain life, that air, breathed into us with the breath of life, has been viewed as an active agent in putrefaction, and crude ideas have often been expressed to me regarding the identity between decay and simple oxidation. It is rare to find a meat-packer who knows that meat will putrefy *in vacuo.* If I take a vessel into which meat is placed, introduce at the same time some charcoal charged with sulphurous acid, in sufficient amount only to seize the oxygen of the residuum of air left after exhaustion by a good pump, and attend with scrupulous care to the tightness of the vessel, and all other conditions calculated to avoid fallacy, the meat thus treated putrefies much more rapidly than a piece of meat hung up in the open air. Nay more, if the experiment be varied by saturating the meat with carbonic-oxide gas, as a means of expelling the oxygen, and even use bin-oxide of nitrogen, instead of the charcoal and sulphurous acid, so as to deprive the air completely of its oxygen, provided the amount of bin-oxide be not in excess, the meat putrefies more rapidly than a piece subjected to atmospheric currents. Oxygen is not necessary, therefore, to start and maintain decomposition.

Not only, however, does meat hang longer unchanged in the open air, but the ordinary process of canning cooked meats leads daily to the repetition, *ad infinitum*, of a simple experiment which any one can make with a Florence flask. If a piece of meat be placed in such a vessel and boiled steadily at 212° or a little higher for five or six hours, and the neck of the bottle then hermetically sealed with a blow-pipe, it will be found that the meat does not decompose; and though the heat would rarify the air and leave but a small trace behind, still the experiment can be repeated so as to leave a certain amount of atmosphere purified by the prolonged action of heat, and the meat keeps.

You will thus appreciate that we have to search for other agencies as to the causes of putrefaction besides those which chemists have been pleased to define. Liebig once said: "In the formation of animal and vegetable substances, the vital principle opposes, as a force of resistance, the action of the other forces, cohesive attraction, heat and electricity—forces which render the aggregation of atoms and combinations of the highest order impossible except as living organisms. Hence it is," he continues, "that when those complex combinations which constitute organic substances are withdrawn from the influence of the vital force—when this no longer is opposed to the action of the other disturbing forces, great alterations immediately ensue in their properties and in the arrangement of their constituents. The slightest chemical action, *the mere contact of atmospheric air*, suffices to cause a transposition of their atoms, and to produce new arrangements; in one word, to excite decomposition. Those remarkable phenomena take place which are designated by the terms *fermentation*, *putrefaction* and decay; these are the processes of decomposition, and their ultimate results are to reconvert the elements of organic bodies into that state in which they exist before they participate in the processes of life." The vital principle which was said by Liebig to oppose the continual action of the atmosphere, moisture and temperature upon the organism, has been termed *vis vitæ*, whereas *vis inertiæ* implies the property whereby the elements of dead organic matter retain *passively* the position and condition in which they have been placed.

The great tendency manifested by organic and especially animal compounds to decomposition has been in times past ascribed to the large amount of nitrogen they contain. This gas is supposed by some to be simply mixed with oxygen in forming the air, from the readiness with which the latter is appropriated by animals and even inert matter. It is not parted with by animal tissues so long as they retain their structure and life. But death and nitrogen gas, according to some old authorities, might be defined by the same sentence—"principle of dissolution." The affinities of nitrogen have been described as slight, and Liebig long since asserted that "when those substances are examined which are most prone to fermentation and putrefaction, it is found they are all, *without exception*, bodies which contain nitrogen." Nitrogenous compounds, coming in contact with water, undergo spontaneous decomposition, and this influence of water is said to depend on chemical affinity. We well know how readily meat decomposes in a damp atmosphere, and how long animal products will keep in a rapidly drying medium. The dried-up bodies of men and animals in South America prove this, and butchers are aware that in the winter the weather may be cold, but a damp air will turn the freshest meat sour in a few hours. But I take a piece of meat which has been preserved fresh for months, expose it to moisture in a moist atmosphere or even by immersion, and it resists destruction so long as my preservative agent is not completely washed out. A few drops of carbolic acid on meat will completely prevent decomposition, and it is hard to believe that this acid has simply affected the affinities between nitrogen and water.

It is easy to prove that its action is of a different nature.

And here I must state as briefly as circumstances permit, the result of recent investigations, which tend to prove the universal operation of the law announced by William Harvey, "*omne vivum ex ovo*." The development of infusoria, of microscopic organic forms, bacterium, vibrio, &c., in putrid substances, has long since been recognized. Pouchet of Rouen, in a work on Heterogenesis, or Spontaneous Generation, has striven to prove that these living, moving particles are due to the development, arrangement, growth and coalescence of molecular matter which produces an opalescence in vegetable or animal infusions. This opalescence is first seen on the surface, and the scum or pellicle thus formed has been termed by him proligerous. Professor Bennett, of Edinburgh, delivered a lecture before the Royal College of veterinary surgeons of that city on the 17th of last January in support of Pouchet's theories. On the other hand, Pasteur has attempted, and, in the opinion of many, most successfully, to prove that putrefaction is due to germs deposited on organic matter prone to decomposition, and that the development of infusoria from pre-existing parents is the cause of changes, which, as I have striven to show you, Liebig considered due to a disturbance of chemical affinity by the loss of life.

Professor Wyman, of Harvard College, in a paper on "Living Organisms in Heated Water,"* has published the account of experiments which support Pasteur's view, and he has shown that prolonged boiling of the spores which give rise to decomposition, at a temperature of 212°, effectually destroys all the germs, and the organic matter excluded from the air in the vessel in which it has been boiled resists putrefaction. His conclusions were as follows:—

1. In thermal waters plants belonging to the lower kinds of algæ live in water the temperature of which, in some instances, rises as high as 208° Fahr.

2. Solutions of organic matter boiled for twenty-five minutes and exposed only to air which had passed through iron tubes heated to redness, became the seat of infusorial life.

3. Similar solutions, contained in flasks hermetically sealed, and then immersed in boiling water for periods varying from a few minutes to four hours, also became the seat of infusorial life. The infusoria were chiefly vibrios, bacteria and monads.

4. No ciliated infusoria, unless monads are such, appeared in the experiments referred to in the above conclusions.

5. No infusoria of any kind appeared if the boiling was prolonged beyond a period of five hours.

6. Infusoria, having the faculty of locomotion, lost this when exposed in water to a temperature of from 120° to 134° F.

7. If vibrios, bacteria and monads are added to a clear and limpid organic solution, this becomes turbid from their multiplication in from one to two days. If, however, they have been previously boiled, the solution does not become turbid until from one to two days later, and in some of the experiments not sooner than does the same solution to which no infusoria have been added.

The lard and tallow-melters are daily affording us opportunities for the most extensive and satisfactory demonstration of the truth of Professor Wyman's conclusions. The boiling down of offal, which in winter in these cold latitudes is fresh, but in summer is almost invariably in an advanced state of putrefaction, proves that the employment of sufficient heat to liquefy and separate the fat is not sufficient to prevent the product obtained from heating and destructive changes. If the temperature is raised and the cooking prolonged for a whole day or even longer, the most complete preservation is insured; and specimens of lard boiled long and with care to avoid burning retain their color, taste and perfect purity for an indefinite period of time.

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* "American Journal of Science and Arts," Vol. XLIV., September, 1867.

I have before referred to the process of canning meats. Tin vessels, to hold eight or ten pounds of meat, are filled, and covers soldered firmly over them. A small aperture is left in the lid according to one process, but in the other the whole is kept tight during the period of boiling in an open water bath, the water of which is heated above 212°, by using a certain quantity of chloride of calcium or other salt in it. When the cans have been cooked for six or eight hours, if perforated, the operator passes round with a cold wet sponge, and, touching the opening, checks the jet of steam. A drop of solder is made to fall on the opening and the process is complete. The cans, bulged by the heated and expanded liquid, collapse on cooling, and the flat ends, being the weakest, yield, whereas the cylinder remains intact. When the lid is not pierced at first, and the meats have been subjected to the action of condensed steam in the tight tin cans, the operator pricks the cover after the boiling is complete, steam flies out, and the opening is promptly soldered. The same collapse of the ends of the cans occurs on cooling. Cans of meat by the million are thus tested in rooms kept constantly at a temperature of 90° or 100° Fahr., and but few show signs of change for years afterwards. Heat, the abundant moisture within the can, the unaltered organic compounds, remain. Molecules do not form, multiply, aggregate or develop into bacteria, vibrios or monads. The conditions within the can are conditions which the chemist or the advocate of spontaneous generation can scarcely deny ought to be favorable to decomposition, especially in the testing-room or in the tropics; but no, the germs of decay have been destroyed, just as they are by the diligent lard and tallow-melter, and five and thirty years even have failed to bring about the molecular aggregation of Bennett and Pouchet.

Another and very ancient process of meat-preservation consists in cooking meats, sausages, &c., and enclosing them in well-cooked fats. Dr. Redwood, of London, has used paraffine as a coating, and various materials have been recommended for the protection of spiced or cooked meats. One of the simplest applications of this heating or germ-destroying process is that of instanstaneously dipping eggs in boiling water, coagulating a thin outer layer of albumen, and thus rendering the whole mass incapable of putrefactive change.

The whole of the foregoing processes serve to confirm Prof. Wyman's observations, and are based entirely on the efficacy of sufficient boiling in the destruction of the germs of decay.

But let us now for a moment turn to the conditions under which putrefaction most readily supervenes; and our illustrations had better be gathered from the experience of butchers and others handling meats. From the fact that summer is the season when, above all others, animal produce undergoes rapid change, it might be supposed that heat alone was sufficient to excite changes, and there is a vague impression among meat-packers that animal heat is something different from the ordinary 100° Fahr., and is worse than any other kind of heat. They know that meat in strips hung exposed to a tropical sun dries; that the buffalo meat which the Indians save, and the charqui of South America, are but illustrations of the preservative power of heat. Heat is there applied so as to dry the meat, and the elimination of moisture tends to make the fleshy fibres indestructible. If, however, a quarter of beef is hung up during hot weather, the surface may dry and remain sound, but the interior turns, and is soon green.

Even in winter a lot of hogs may be killed in the evening, and whilst still warm packed in carts ready for delivery early next morning. The carcasses buried beneath others heat. The cold hogs remain intact, but the hams of the lower ones taint in pickle. Masses of frozen hams termed "green," in the trade, —that is, which have been a few days in salt,—are sent from the West to New York; are purchased by provision-dealers; they are tested, and apparently sound; but when spring-time comes, and a thaw supervenes, large quantities of these hams turn. The salt has not penetrated. A putrefying centre has been surrounded by ice; all has remained stationary so long as the temperature has been low; but the instant heat supervenes the process advances, and the entire ham turns sour. Ham-curers will tell you that it is the interior of the joints and the marrow of the bones that are most likely to taint, and all this they attribute to that deadly agent, animal heat. They say, "Insure me that I can get rid of all the animal heat at once, and I can cure meats without loss; but any internal heat must be attended with a certain percentage of taint." Your heavy Chicago meat-packers commence operations about the middle of October, and pack only during winter. Packing in ice in the summer is expensive and dangerous, and ice-packing in the South, in Texas and other States, has been attended with the most disastrous failure.

Pouchet and others may say that germs could not readily pierce the frozen mass around the putrefying centres; that the critical point in the thigh, which the connoisseur in meats calls the pope's eye, is shut up from atmospheric contact, and Pasteur's germs could ill reach the innermost recesses of the marrow. For a long time observations puzzled me, but I soon got light from practical experience. I take a heavy piece of beef in the month of July, and subject it to the process I successfully adopt for the preservation of meats; but I only allow time for the surface to cure, and in a day or two remove the beef from the preserving-cans. A depth of an inch may be reached before evidence is obtained that the meat within is still unacted on by the preservatives. I stick a trier, a pointed steel probe, into the meat, and find it perfect. It hangs for an hour. I cut open the meat, and right along the track of my trier the flesh is green; elsewhere the tissue is intact.

But you will say the ham-curer finds the sourness in the interior of his hams when he first pierces them; and whilst acknowledging the justice of this remark, I have to draw attention to the open vessels, channels, through which the germs of bacteria vibrios and monads can travel at their pleasure. The arteries are open tunnels with solid parieties, affording ready access to the smaller vessels, where the blood constitutes the best pabulum for the penetrating infusoria. Deep within a frozen ham, protected by excellent non-conductors, such as the bony walls around the marrow, the germs of putrefaction resist disturbing influences, and when the time comes invade the whole mass.

No one that I have heard of has yet explained the singular phenomena which would puzzle chemists and the advocates of heterogenesis. How is it that meat placed in refrigerators, and which has been buried in ice or kept in a very low temperature for days and weeks, instantly decomposes? Putrefaction advances so rapidly that the meats are unmarketable unless transferred to and kept in ice up to the moment of being used. I think this admits of ready explanation. The surface of meat which dries in the summer is, in common with the interior, kept unchanged, except as regards the lowering of the temperature. Atmospheric germs gather in it, and in the interior of the blood-vessels, and the moment the meat is heated moisture and an accumulation of atmospheric germs complete the conditions for instant decay.

In therefore considering the deterring effects of heat and cold as regards putrefaction, we must not forget the process of drying, which is possible in the first case, and the manner in which vitality remains latent is for a time suspended in the germs under the influence of cold, but manifests itself so soon as conditions are favorable.

Animal heat is no more than any other heat, but it is operating in parts where the moisture is retained, and with an external temperature of 90°, 100° or 110° Fahr., such as we had when we were packing meat last summer in Chicago, it is not to be expected that exposure to the air will be followed by a reduction of the internal heat.

This leads me to consider in what ways meat may be rendered less putrescible. If I want to preserve large masses of flesh to be exposed in the open air, I must render that flesh an unfit soil for the reproduction of putrefactive germs.

Salt and sugar act by their affinity for water; and, in obedience to the well-known laws of endosmosis and exosmosis, the juices of the meat passing out to the dense pickle, and the salt or sugar penetrating and becoming intimately blended with the meat particles. So soon, however, as any decomposition occurs under the influence of exalted temperature in the interior of the meat, a mass of living organisms develops, and the altered flesh liquefying, is transformed into the textures of the low organisms which infest it, and thus fails to take the salt. The gases of decomposition are likewise formed, and the structures are inflated and disorganized beyond chance of restoration.

The slightest knowledge of the fundamental principles in operation in salting meats would have saved thousands of pounds to enterprising persons who have adopted the infiltration process. More than thirty years since it was suggested that the slow process which demands thirty days for the penetration of salt into thick pieces of beef and pork might be expedited by injecting the pickle into the arteries. Of late years Dr. Morgan has revived the plan and patented it. It has been extensively tried, and although occasionally with apparent success, on the whole it has proved a failure. It has injured even wealthy men in Texas, and has contributed to swell the already considerable body of men who look with some contempt on all innovations in the art of preserving meats. Now it is obvious that a mild pickle, freely diffused throughout the tissues, could alone leave the meats in a palatable condition. But then the amount of water introduced into the body would leave the meat in a very different condition from that of ordinary and properly cured corned beef. In fact, with a mild pickle, calculated to leave the flesh palatable, putrefaction speedily ensues; whereas a strong pickle, distending the vessels, attracts the meat-juice, and an ordinary salting takes place, but the meat is not in a fit condition for use. Dr. Morgan may, with considerable show of justice, assert that the prevailing process of salting results in the manufacture of an article as unfit for human food as any he can prepare with a strong pickle; and it is a disgrace that in the nineteenth century our armies and navies are supplied with meats "cured" or "saved" at the expense of all that is good, savory and nourishing in animal food. A heart-rending picture could be exposed to view by some eloquent member of the medical profession who is well informed of the progress and ravages of scurvy in the merchant and admiralty services of different parts of the world. During your civil war meats were supplied to soldiers which were quite unfit for hogs to eat. It was removed from the "original pickle," in which it had retained some nutritive properties, but in which it could not be kept fresh for any length of time. It was repacked —that is to say, again heavily salted—and the result, as tersely expressed by a New York packer, is a mass of fibres all but worthless for the purposes of human food. Not only, however, is beef thus deteriorated; pork, first salted by an application of brine, is often in very fair use for moderate consumption. But the market gets overstocked, and the repacking system is adopted with the same if not worse results than those alluded to with regard to salt beef. Referring to this kind of meat, a practical curer has said: "If we attempt to roast or broil or fry it, the application of fire for either purpose, by further contracting the already contracted fibres, hardens it to such a degree that it cannot be consumed. If we boil it without previous soaking to remove the superabundant salt, the result is about as bad; if we soak it first and then boil it, the remainder is a lump of fibre, almost indigestible, and entirely useless for health and strength-giving purposes."

"We eat it," remarks Dr. Ure, "on the same principle as that ascribed to alligators, who swallow stones to appease the cravings of hunger." "Having had its most valuable matters removed by cold solutions of salt, the junk is next deprived of its gelatine and osmazone by boiling water, and nothing but a mass of fibrine, scarcely if at all susceptible of assimilation to the powers of the animal economy, remains to give the appearance of food to the product, and as it were keep the word of promise to the eye to break it to the hope."

Admitting all that can be said, and it is much, against the extensive practice of salting meats, it is a necessary evil at the present time, and must continue so till completely superseded, as I believe it will be, by a method of fresh meat preservation. The demand for salt meats is however so great, especially in times of war, that other plans besides the infiltration process have been suggested to facilitate the supply. The salting of meats with hot pickle, the placing beef or pork in air-tight receivers, exhausting the air, admitting brine, and subjecting the whole mass to active motion, and lastly the forcing of brine into barrels with a condensing pump, are all expedients which have been tried and failed. Salting demands a gradual action, the result of the establishment of endosmotic and exosmotic currents between the mass of meat and its surrounding pickle. I shall further on allude to the mild salting of preserved meats, and in the mean time have to draw attention to the principles and practice of other means of saving meats.

I shall not detain you with processes aiming at the concentration of flesh-juice or the drying of the whole mass of meat at a low temperature, with a view to pulverizing and pressing it alone or in combination with other materials. The plans adopted entail cooking, and the result is not the supply of animal food in a condition desired generally by meat-consumers.

Numerous experimenters and patentees have resorted to antiseptic salts in powder or solution, especially hyposulphites, sulphites and bisulphites, in order to check the decomposition of meats, but as yet none have had any great success. The sulphites destroy the germs of decomposition, and sulphurous acid taken up by meat in proper quantity renders the latter very capable of resisting decomposition. The whole list of antiseptic agents has been ransacked for available articles to be used in saving meats, and yet very few are known that can be used with advantage.

The greater number of investigators aiming to preserve fresh meat have attempted to withdraw it from atmospheric contact by enclosing it in air-tight vessels and displacing the air by other neutral or active gases. The most perfect and most valuable process ever suggested was that of Hands & Jones, which consisted in placing meats in well soldered tin cans, which were provided with tubes, and could be placed in a strong iron box, full of water, in order to exhaust them with the air-pump. Having exhausted a little, bin-oxide of nitrogen was poured in to destroy the remaining oxygen, and then sulphurous acid poured in to the extent of twenty-five cubic inches for every pound of meat. The remaining space was filled with nitrogen. Meats thus preserved in closed cans have been eaten in all parts of the world, but the process could not always be depended on; the salts of tin would flavor the meats, the meat-juice became expressed out of the muscular fibre, which was left pale and soft, and a heavy percentage of the meat thus packed failed to keep.

My attention was directed to the subject for some years, and I was so impressed with the importance of extensive investigations that I suggested to my friend Dr. Parkes, the well-known and able author of the work on "Hygiene," that the British government should aid, with a view to the solution of a problem which promised so much for our densely-peopled islands. This was a matter of difficulty, and time rolled on until the Russian murrain was imported amongst English cattle, and propagated over our best cattle regions. I had previously insisted on the defective nature of our veterinary inspectorship at ports, and the paramount necessity for the formation of special markets for foreign cattle, so that these should never come in contact with British animals. Failing in these attempts, my attention was naturally directed to some means whereby carcasses of animals might be imported ready for the butcher from any part of the world; and I was induced by some friends, who promised pecuniary aid, to embark in my new work. In January, 1866, I made the first considerable series of experiments on the feeding of animals with peculiar products, so as to render the flesh much less perishable, and some remarkable results were obtained with oak-bark. I soon found that the whole problem was a chemical one, and I allied with myself my brother, Dr. Arthur Gamgee, whose labors in physiological chemistry had peculiarly fitted him for such researches. In September, 1866, my brother was casually explaining results of some experiments on the action of gases on the blood, and especially of carbonic oxide, without reference to meat-preservation, and I at once saw that this gas must fulfil some of the conditions desired of preservatives. Prof. Claude Bernard had drawn attention to the uniformly florid, arterial color of the blood of animals poisoned by carbonic oxide gas. This blood which would absorb 8.2 per cent. of oxygen from the air, before the action upon it of carbonic oxide, was only capable of absorbing 1.66 per cent. after the action of the gas, and this Bernard attributed to some action of the poisonous gas on the blood corpuscles. Lothar Meyer, working under the direction of Bunsen, was led to the conclusion that for every volume of carbonic oxide absorbed by blood there is one volume of oxygen expelled, and was led to the induction, which he has since shown to be correct, that the blood contains a substance which has the power of forming a definite chemical compound either with oxygen or carbonic oxide, a molecule of the one gas being able to replace a molecule of the other. Dr. Hoppe has shown that the blood of animals poisoned by carbonic oxide, besides being possessed of a remarkably florid color, when mixed with its own volume, or twice its own volume, of strong caustic soda, (of sp. gr. 1.3,) and well shaken, gave a coagulum of red color, which, when drawn over porcelain, left streaks of a cinnabar red color, whilst normal blood, treated in the same way, yields a black, mucilaginous mass. Hoppe discovered that peculiar and beautiful absorption bands were observed in the spectrum when light was passed through the blood, before being examined by a prism; and Prof. Stokes ascertained that the blood-coloring matter is capable of existing in two conditions, in one of which it is more highly oxidized than the other; that the less oxidized substance may be readily produced by acting upon blood by suitable reducing solutions; that it is characterized by a single and very characteristic absorption band, and that by mere agitation with air it again becomes converted into the more highly oxidized substance.

Independently of each other, my brother * and Hoppe Seyler discovered that blood which has been treated with carbonic oxide, besides acquiring a permanently florid character, remains quite unaffected by such reducing agents as were shown by Stokes readily to deoxidize blood-coloring matter; i. e., the two bands of scarlet cruorine remain unchanged, and are not replaced by the wide absorption band of reduced or purple cruorine. My brother considers that the florid color of blood treated with carbonic oxide is due to a decided action on the constituents of the red blood corpuscles, which Bernard showed retained their shape under such circumstances for a remarkable length of time. "When blood saturated with carbonic oxide is placed for a considerable time in the vacuum of a good air-pump, and the exhaustion is pushed till the tension of the air in the receiver does not exceed three or four millimetres, no change is produced in the properties of the blood. After the exposure *in vacuo* the blood is still irreducible."

"When such blood is evaporated to dryness in the water-bath, at a heat not exceeding 140° Fahr., the dry residue, when treated with water, yields a solution of coloring matter which is as irreducible as the original blood."

"When a solution of blood is mixed with a very large excess of a reducing solution, and carbonic oxide is then passed into the solution, at once the single band of reduced cruorine disappears, and gives place to the two well-marked absorption bands characteristic of scarlet cruorine and carbonic oxide cruorine."

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* For my brother's observations and researches, see the article from which I am quoting, entitled "On Poisoning by Carbonic Oxide Gas and Charcoal Fumes;" Journal of Anatomy and Physiology, No. II., published by Macmillan & Co., Cambridge.

My brother, from whose paper I have just quoted, also ascertained that when blood which has been treated with carbonic acid is acted on by acids, so as to decompose it, the carbonic oxide is evolved unaltered, and this occurs in all probability when any blood or meat juice charged with carbonic oxide putrefies.

The facts I have laid before you constituted, in addition to the experiences of meat-preservers before us, the starting point for experiments more numerous and extensive than had probably ever previously been made in attempts to preserve fresh meat.

Carbonic oxide gas would preserve the color of our meats, expel the oxygen from the tissues, and act as a neutral gas in the place of air to surround the meat in air-tight vessels.

We resolved on resorting to the air-pump, and much of my success has been due to the excellence of Bianchi's air-pump, which I imported from Paris. But we knew that the antiseptic action of carbonic oxide was slight, and other agents had to be used. Time will not permit me to relate the experiments with ozone, heavy vapors,—such as chloroform, ether, tetra-chloride of carbon, bi-sulphide of carbon, bi-chloride of methylene,—or with carbolic acid, permanganates, chlorine and its compounds, hydro-chloric acid in particular, bin-oxide of nitrogen, sulphites and nitrites. We soon found that the gas which had been most commonly regarded as the meat-preservers' friend would best serve our purpose, and accordingly we soon relied on sulphurous acid. But every one had failed in times past to use this acid, particularly on a large scale. We had to destroy the germs of putrefaction left in the residuum of air on the meat and on the sides of the preserving cans. The acid gas has to saturate the meat so as to render it incapable of putrefaction. The water evaporating from the meat had to be absorbed, and above all things the exact measure and weight of the gas to the pound of meat had to be ascertained and used. I fortunately thought of condensing sulphurous acid in charcoal; and whilst we have at our disposal other means of condensing the same gas, I believe that charcoal saturated with sixty-five times its volume of sulphurous acid will remain to the end of days the cheapest, most manageable and most universally employed preservative that the meat-preserver can use. It is perhaps bold to predict that which I do, with the greatest confidence, that charcoal and sulphurous acid will in a few years' time, to a great extent, supersede the use of salt.

It is a compound which can be readily prepared and weighed, the strength of which is uniform and the action of which never varies. Sulphurous acid left in contact with dry air remains uncombined; but when absorbed by charcoal its avidity for oxygen is enormously increased, or perhaps it is safer to say that the charcoal tends to favor the contact of air and acid gas so as to insure a prompt combination. The compound, however, has other advantages. The acid gas is held in the charcoal pores even *in vacuo*. It is given off gradually just as the meat can take it up, and in fact as the meat parts with watery vapor the charcoal becomes saturated with moisture. It is, therefore, an excellent drier, and you will have gleaned from what I have stated that in all processes of meat-preservation desiccation is an almost essential adjunct.

For some months after I first successfully used the charcoal process, I continued, with somewhat imperfect appliances, to pack meat in iron cans, with lids soldered on, and tubes of ingress and egress for exhaustion and the admission of gases. I was impressed with the idea that has repeatedly destroyed the hopes of meat-preservers, that it was easier to keep meats in hermetically-sealed vessels than in the open air. We learned in the summer of 1867 that meats preserved in cans, by the combined action of carbonic oxide and sulphurous acid, would cross the Atlantic, if packed in simple brown paper, and from that day to this my operations have been directed to the preservation of the entire carcasses of animals, which require, according to their size and thickness, from five to twenty days for their complete preservation. Meat thus preserved I have now the pleasure of showing you, and an opportunity will be afforded you of tasting and otherwise examining it. Such meat keeps many months, and may be preserved anywhere, at any season of the year, and when other modes of preservation, such as salting, are impracticable. There are conditions to be observed according to the surrounding circumstances; but anywhere and everywhere animals can be cured, by the dozen, fifties or hundreds, in air-tight compartments, and the cost in any part of the American continent cannot exceed, including all possible expenses, a dollar for a bullock and ten or twenty cents for a sheep.

We have packed meats in Chicago and New York which have been eaten in the hottest parts of this continent; and we are resolved on following up a success which is quite unprecedented in the art of fresh meat preservation, and demonstrate that the problem, which the Old World has sought for years, and the New has so much interest in unravelling, is finally, definitely and irrevocably settled.

The past year has shown me that if I crossed the Atlantic to accomplish a task which the ravages of the cattle plague in Great Britain imposed on me, cattle disease and the wants of the people even in America call for the adoption of some process for the preservation and transportation of dead meat. It is often difficult for a scientific man to convince and secure the co-operation of capitalists. I have been most fortunate in my associations on this continent; but much more would be done at once, especially in Texas, with its five million beeves, but for the severe reverses of all who have hitherto listened to those who have fancied they had discovered an infallible meat-cure. The ravages in the Western and Eastern States by splenic fever, the interests of the Gulf States, and the repeated demonstrations of the truth of what I state, have paved and are paving the way for an early and triumphant success.

To the farmers of this country, and indeed to the whole human family, the advances in the art which I have had to espouse are of the highest moment; and it is needless that I should detain you with statistics which have so shocked and tantalized those whose concern it was to study all conditions calculated to increase the prosperity of densely populated countries and to feed the half starving millions of Western Europe.

I do not wish you to suppose I have been divorced from the science which led me step by step to this pass. The investigation of the diseases of animals, with a view to their prevention, and to the increase and purification of the sources of human food, still constitutes my first and best means of solace and advancement. Your country loses annually over one hundred million dollars in gold by preventable diseases among animals; and the most insidious, most destructive and most widely diffused of contagious plagues, the lung plague, stamped out of

Massachusetts a few years since, has established for itself fixed stations—north, south, east and even west—whence it should be effectually and at once driven by appropriate measures. It is this above all other tasks I should wish to co-operate in, if only to prove to my own countrymen that the mingled feelings of regret and indignation which the physician tells us he experiences when he witnesses the ravages of typhus and smallpox, can be shared by me in relation to a malady which, but for the cupidity of some, the ignorance of others and the weakness of governments, would long ere this have been cleared out effectually from the British realm. I have been honored by the confidence of your commissioner of agriculture, and believe I can lay claim to as much at the hands of the committee of agriculture in Washington. It is for your interest, gentlemen, and for the interest of the entire continent, and beyond the Isthmus down to Patagonia, that science should no longer be gagged and starved, and that rational, complete and decisive measures be adopted to place the outbreaks of contagious pleuro-pneumonia amongst the things that were. I shall say nothing now about the Old World. The time has come for reaction there, and I yet hope to strike home a wedge that first cracked a crevice under my hands fourteen or fifteen years since.

Col. Wilder. I should be uncourteous, and I may say ungrateful, as Prof. Gamgee has alluded to the fact that I have had the pleasure, in Boston, of tasting specimens of meats preserved by his system, did I not respond in a word.

The Massachusetts Agricultural Club were honored, in the early part of last April, I think it was, with the presence of Prof. Gamgee as a guest, when he presented us with a fine leg of mutton, cooked at the Parker House, which he informed us had been preserved in London in October, and came out in a dry box, without any other preparation or care, to New York. We had on the table, the same day, a very fine leg of mutton of our own growth ; and, to our astonishment, we found that the leg which we had from Prof. Gamgee was more juicy, was riper, than the other, and was, in fact, a first-rate leg of mutton, in perfect preservation. He has alluded to the color. It had a deep, florid, beautiful color, surpassing that of the fresh leg. It was more juicy; and, in a word, we should have taken it to have been a ripe, mature leg of mutton, just fit to eat.

Prof. AGASSIZ. May I add another testimony? I was not present at that meeting, but a friend of mine, the French consul in Boston, who was there, told me that he had tasted of that mutton. Now let me tell you who that man is. The French consul is a gentleman who has been brought up in high life in France, accustomed to all the luxuries of life; used to dine at the best restaurants of the Palais Royal for years. He knows what eating is, in the best style in which French cookery can produce any article of food, and he told me he never ate better mutton than he ate that day, from that leg, prepared in London in October and eaten in Boston in April.

I wish to say one word about the methods which have been followed to obtain this result. You will have perceived that they are entirely and exclusively scientific. It is only the most recondite microscopical investigations, only the most advanced chemical knowledge, the most delicate practice in chemical experiments, which have enabled Prof. Gamgee to obtain this result. Without this advanced science this result would not have been attained. I make the remark, not that there is anything new about it, but because I want, on every occasion that is afforded me, to check this impression which is so general, that there is a want of connection between high science and practice, and that high science is not practical. There is nothing more practical than the most advanced science.

Prof. GAMGEE. Will you allow me, as my time here is very short, to say a few words? I do not like to leave Amherst and to leave this pleasant meeting without reference to the great importance in this country of adopting some means whereby farmers' sons and others may have an opportunity to be taught not only the rudiments or elements of veterinary science, but all that can be known of the diseases of animals. I remember talking, about a year ago, with the head of the old veterinary college in London, with whom I have had many and many a battle, and he looked very black at the idea of a professor of veterinary surgery being appointed at an agricultural college, "because," said he, "you will fill the country with quacks. You will have here a lot of half trained men competing with our own students, and what will be the result? You will diminish their living. They will not be able to get as many fees as they did before." Now I think you cannot be astonished if I say that I have very little respect for a man who can stand upon such a platform as that. I have had the honor of being at the head of veterinary colleges, and my idea was, that the more I could impress farmers with the notion that I knew more than they did, and that I could come to their rescue in times of difficulty, the more they would fly to me. But apart from that question, we have to practise a profession which is worthless unless we can benefit mankind. The circumstances under which it is to be practised are such that it is impossible for us to be useful in the large majority of instances where disease attacks domestic animals. What is the use of calling in a veterinary surgeon and paying five, ten, fifteen or twenty dollars to cure a sick sheep? What poor young farmer, just starting in life, is able to secure a special investigation of disorders that attack his own flocks or herds and may not exist elsewhere? It is evident that it is for the interest of any country—it is for the interest of the farming community and of the veterinary profession—that the science and art of preventive medicine should be developed to the highest possible point; and we are no longer in the maze of ignorance and superstition that perhaps still operates to our disadvantage in North Holland, in Friesland and in some other countries, where the poor people go about with their priests to prevent the cattle plague, believing that all these diseases are visitations of God for their sins, and that it is useless for them to try to help themselves; that God sends the calamity upon them, and they must bear it as best they can, as an example to suffering humanity of their great patience and Job-like virtues. We are really growing out of that condition of things; and, as Prof. Agassiz takes occasion at all times to strike the nail on the head that he wishes should go down, so I have a nail, and my nail is, the idea, which I wish to advance generally, that every case of sickness that occurs is preventable. It is true there are inevitable accidents, there are inevitable diseases, which will last to the end of time; but there are also extinct diseases, which have gone before, and there are many now that should be things of the past, that we have already the means to put among the things that were, and that should be put among the things that were.

Now, it is impossible for this great continent to become, as it possibly may, the greatest farming country in the world,—your broad acres are such, the conditions of this continent are such, that you may rise to be the greatest agricultural country in the world,—it is impossible, I say, for you to become such, if you overlook those troubles which come upon the poor farmer like a clap of thunder. He knows not what the causes of the tempest are, but it comes and blights his grain and destroys his animals. I have heard of one place in Illinois, where some Texas drovers stopped with their herd over night, and three or four hundred head of cattle were destroyed in a few weeks. Children were literally starving because they had no substitute for the milk that came from the cows. The life of the people was at stake there. So it was with us in England at the time of the cattle-plague. And you have it still in New York, in Philadelphia, in Boston,—I beg your pardon, not in Boston; Massachusetts deserves well of the country,—but in New York, in Philadelphia, in Baltimore, in Washington itself, their cows are diseased, and the withered flesh of these animals is consumed by human beings. What can you have but diseased men, women and children?

You see you have here one of the most important sanitary questions of the day, and you can meet it by the study of preventive medicine, which every farmer and every man who has any stock should understand. You should have the finest veterinary college in the world. It is a disgrace to the American people that they have not the finest veterinary college in the world, although they are so young. But I want to drive my nail home. I am going back very shortly to England, and I wish you to have these words ringing in your ears: that you should do everything that possibly can be done, under the circumstances, for the education of your farmers in veterinary science, and for the development of veterinary institutions. Go to the next legislature and ask for a veterinary professor at the Agricultural College. I will go to Boston ten times and lecture upon the matter, and I will ask Prof. Agassiz to help me. I will do more. I will provide you with a competent man, if I can only be permitted to do so—a young man of large understanding, with ability and pluck, and a man who can stand up and not be ashamed of the veterinary profession. Men say, "Nothing but a horse-doctor." I call myself a horse-doctor, and what am I? I can be more useful to the people of my country, I can be more useful to you, than any member of the medical profession, or any other profession, in a practical point of view, directly and immediately. I say this without qualification.

Prof. AGASSIZ. I want to say one word upon this subject. I alluded this morning to a college in this country, now two months old, the Cornell University. That college has already a professor of veterinary science, who was a pupil of the gentleman who has just addressed us.

HOW TO MAKE FARMING PROFITABLE.

The Chair announced that the next subject for discussion was, HOW TO MAKE FARMING PROFITABLE, which would be opened by WILLIAM CLIFT, Esq., of the "American Agriculturist," of New York City.

Mr. CLIFT. I find myself put down in the programme, by the President of the College, I suppose, to open the discussion upon the question, How to Make Farming Profitable. Well, I shall not assume that farming is not profitable already, in some degree. A business that feeds and clothes the larger part of forty millions of people directly, and indirectly all the rest, cannot be said to be an unprofitable business. Nor is it assumed that there are no farmers who do not already come up to the standard of making farming as profitable as merchants and mechanics make their business; that is, make it pay an average on the investment of seven per cent. I suppose that is what the ordinary rate of interest anywhere in the country indicates. The average value of investments is the ordinary rate of interest, whatever that may be; and if there are any farmers who make their business pay them seven per cent., their business is just as profitable as the average business carried on in the country. I suppose there are farmers who get seven, eight, nine and ten per cent. on their investment; but the great mass of our farmers, all through New England and the North,—the most prosperous part of the country,—do not get that interest for their investments. They do not get five per cent., or four per cent.; a good many do not get three per cent. on the amount of capital they have invested in their business, and so their business, to that degree, is not profitable.

Now, what shall be done to make the business pay as other investments pay? In the first place, I think we want more faith in our business. That is the one great want in all farming communities—faith in their business. What is the indication that they have not faith in their business? You may look into almost any of our agricultural parishes here at the North, and you will find that they have been continually decreasing in population for the last fifty years—unless that decrease has been arrested in the last ten years, during which time we have had agricultural societies established, and a great many agricultural papers established, and agricultural colleges established, and means taken to enlighten the public upon this great interest and make it more profitable. I say in almost all the exclusively agricultural parishes in the older parts of the North the population is decreasing, or at least stationary. It is so, at any rate, in Connecticut, and I suppose it is so in Massachusetts, and in almost all parts of New England. This shows that the farmers have not a great deal of faith in their business.

Then the tendency of population in the United States is towards cities, and their population is increased at the expense of our agricultural population. We find that in these farming districts farmers' sons almost all leave the farm, showing that they don't believe farming is as good a business as some trading or mercantile business in the city. They are all off as soon as they become of an age when they can be useful. At sixteen, seventeen or eighteen years of age, they are off to learn a trade or some mercantile business, showing that they have no faith in the business of farming. Go into half of our agricultural towns and I suppose you will find half of the farmers ready to sell out, and exchange their business for some other, as soon as they can find an opportunity to sell for a satisfactory price, showing that they have no faith in their business. Now, if a man wants to succeed in his business he must have faith in it as a business that will sustain him and provide for his old age, and afford a comfortable support for his family. That is what we want to see among farmers. When the man who drives down a stake feels that it is driven for life, when he feels that every tree he plants is to be a strong bond to bind him to that spot for life, he will thrive by farming; and when farmers do this they will show to the world that they have faith in their business, and they will be ready to make investments in it, just as the merchant makes investments in his business. The merchant is not afraid to make ventures. When he sees an opportunity for profit he is ready to invest his money in order to secure it. It is not so with the farmer. He is afraid to put any money in the business which he understands best, and which he ought to make pay seven per cent.

Then we want, not only more faith, but more knowledge, in order to make farming more profitable. We want a cheap diffusion of agricultural papers and books. It may be said that we have already enough of these—and certainly the increase of agricultural papers has been wonderful during the last ten or fifteen years; and yet I suppose it may be said that not one farmer in ten takes an agricultural paper, or knows anything of what is going on in the agricultural world. The man who takes an agricultural paper knows about the new apples and the new grapes, and the market price of his own products, and it will be difficult to cheat him. He can get the full value of his crops, because he knows what is going on and what they are worth. But, outside of those who take the papers, and are posted, the great mass do not understand these things. They have not the requisite knowledge to dispose of their crops to the best advantage. They do not know how to raise them at a profit. The great mass of our farmers keep no farming accounts, and do not know whether they are farming at a loss or gain at the end of the year. They have not their business in hand as the merchant has. They do not take an account of stock once a year, and they are not able to determine, when the first of January comes, whether their operations have been profitably carried on or carried on at a loss. I say that is the way most farmers live. They do not keep accounts.

Well, we not only want more knowledge, as diffused through agricultural books and papers, but we want the science of agriculture taught in agricultural schools and colleges; and I hail with great satisfaction the establishment of the college on yonder ridge,—the gem, the beauty, and the glory of this valley,—under the shadow of the college of science, on the hill above us. I have no doubt that it will be a great blessing, not only to this Commonwealth, but to our whole country. The first instance in which an agricultural college is made really successful, is taken in hand, not only by gentlemen, but by farmers, who hail from the plough and from the shovel, thus bringing the art of agriculture in direct contact with its science.

Now I want this Agricultural College to turn out a company of farm managers—men who shall thoroughly understand the business of farming from the beginning unto the end—so that our men of capital (and there are hundreds and thousands of them in our cities who have an itching for farming, and through all their mercantile pursuits are looking forward to a home in the country as the goal of their desire,) may find those who can manage their farms for them. They do not know how to farm it themselves, but they have money enough, and they would like to invest it in a farm, if they knew where to put their hand upon a man who can take their ten, fifteen or twenty thousand dollars, put it in a farm, and run that farm so that they shall get seven per cent. upon the investment or more; and what we want of that college yonder is, that it shall raise up a class of farm managers who shall join their skill and their knowledge to the capital of these men and show us how to farm it on a profitable scale. That is what we want. There is no difficulty in getting the capital. There are thousands of men in our cities who have the capital but have not the requisite knowledge. We want the two things united, and when we have the young men, well trained and competent, to tell our men of capital how to invest their money and make it pay seven per cent., there will be no difficulty in getting money enough to carry on our farming on a larger and grander scale than we have ever yet seen it here in New England.

Well, we want not only more knowledge, but we want more capital invested in our farming. We have a great deal of capital invested in farming, but it is invested in the wrong place. Here is a man who owns a farm of a hundred or two hundred acres. It is worth $10,000, and he has perhaps $2,000 worth of stock on that farm in which he has $10,000 invested, and he will employ on that farm $150 worth of labor a year besides his own hands. Well, now, nine-tenths of all that capital invested in the land does not pay him one per cent. Why? Because he does not use capital enough in stocking it and in securing the labor to work it. The land is good for nothing unless it is wrought, skilfully cultivated, labor laid out upon it; and that, mainly, is the reason why our farms are so unprofitable here in New England. The general style of farming is, a farm of one hundred or two hundred acres, and only a man and boy to work it, and that boy employed only six or eight months in the year. It is rare to find a farm with the requisite force upon it, because the farmer has not faith in his business, wants to get along with as little trouble as possible, is afraid to invest in stock or labor, and so does not get more than three or four per cent. for the amount of capital invested in the business. It does not pay. We want more capital put into the business. Let the farmer, instead of investing his accumulation of three or four hundred dollars a year in railroad bonds, government bonds or bank stock, invest it in his business. If he has $10,000 invested in his farm, and but $2,000 worth of stock, let him increase his stock, so that he may make more manure; let him put up a better barn and buildings, employ more labor, invest his money in his business; and he will, if he has faith in it and believes that farming is going to pay, just as the merchant believes that his business is going to pay. I think there should be a fund (and perhaps Massachusetts is the best State to set the example,) to help farmers who have the requisite skill but lack sufficient capital. I think there should be a fund from the State, or from some other source, that should be loaned to young men who get started in farming, and have not the capital they need to make improvements. Take, for instance, the improvement of underdraining, which is very much needed on perhaps half the land in Massachusetts. There are few farms that have not more or less of their acres so wet that it will not pay to work them in the condition in which they are. Now if the young farmer who has not the requisite capital could go to a government fund, as he can in England, I am told, and borrow enough to drain the few acres that need draining, giving the government security in the increased value of the land, which will be created by the very fact that it is underdrained, it would be a great help to him and a great help to the Commonwealth, because it would increase its wealth and its taxable property. Now John Johnston, the father of drainage in this country, says that two average farm crops upon drained land will pay for the whole expense. It may be forty or fifty dollars an acre. Whatever it may be, if it costs more than fifty dollars, two crops will pay for the whole expense of the improvement; so that the State would be fully justified in loaning the money, and have increased security in the value of the land. The young farmer, who is struggling along in narrow circumstances, would be benefited, and the State would be benefited. Massachusetts is perhaps the best State to try that experiment, which I do not doubt can be done with safety and entire success.

Then, we not only want more capital, but more labor—a great deal more of it. There is nothing in which our farmers come so short as in the employment of labor on their farms. In a recent conversation with Dr. Heximer, who is a very skilful farmer, and makes a specialty of raising potatoes and cultivating small fruits, and who has now a gross income of about five thousand dollars, from a farm of about sixty acres, I asked him what was the expenditure in which he took most satisfaction on his farm, and which paid him the best, and he said, unhesitatingly, "Labor. I get more returns, better returns, for the money I invest in labor than from that which I invest in manure, in land, or anything else." The profit comes from skilful working of the land. Now, in order to work land thoroughly, and cultivate it four or five times, as it should be, our grain crops and our hoed crops must have a great deal of labor. If we are going to subsoil, if we are going to underdrain, if we are going to have high farming, we must lay out a great deal more labor upon our acres. Instead of one man and a boy to one hundred acres, we must have five men, or even ten men. Believe me, the more labor we lay out upon a farm, other things being equal, the better returns we shall get.

And we not only want more labor, but we want, in order to the most profitable farming, a good rotation of crops. We have something of that in New England; but it is not followed systematically. Our common rotation here is, the sod turned over for corn; then, perhaps, grain the second year, or potatoes; then oats; and then the land is stocked down, and it remains three, four, five or six years in meadow—as long as we can get half a ton of hay per acre in return from the land. Instead of this unprofitable system, having no definite term when we will turn over the sod, we want a regular system, such as they have in the grain districts of Pennsylvania and New Jersey. In a trip through that region last summer, I found in all that well-cultivated district of Pennsylvania the regular rotation to be, corn, with from thirty to fifty bushels of lime applied to the acre, either in the fall, before the corn was planted, or in the spring, before the sod was turned over; then followed either oats or fallow, and that fallow was dressed with all the manure that could be made upon the farm, and wheat sowed; then the third year they had wheat, and with the wheat, in the fall, was sowed a little herds' grass, perhaps six quarts to the acre, and early in the spring, before the frost came out of the ground, clover, so that the fourth year the soil would be occupied by clover; then the fifth year it would be occupied by herds' grass; then the sod was turned over again, and corn planted; and so the regular five-years' rotation goes on. Sometimes they will allow the herds' grass to remain two years, and be pastured the sixth year; but the regular rotation was a five-years' course. This course kept up the fertility of their soils, so that in those grain districts the average yield of wheat, in a good year, is twenty-five bushels to the acre, and the soil that will yield that amount of wheat is in what is called "good heart." They make farming profitable in all those districts by reason of their following up this rotation. The rotation in New Jersey is very much like this, only it is often four years instead of five. In such cases the rotation is corn, oats, wheat, and, the fourth year, clover. They sow clover for pasturage, and find that pasturing clover is as good as turning it under in a green state; for the clover, if allowed to grow, and used for pasturage, forms a large mass of roots in the soil, which would not be formed if it were turned under in June, when in a state of green luxuriance; so that what is lost above is gained below. So, all along the line of the Central Railroad, lands have been brought up, by this rotation, from being worth $25 or $30 an acre, as they were thirty years ago, to their present state of fertility, in which the lands are valued at from $150 to $200 an acre. It is difficult to get land, anywhere in that region, short of $150 an acre, and many farms could not be purchased for $200 an acre. A finer wheat district than is found in that region cannot be found anywhere in the country. It is equal to anything in the new wheat-growing regions of the West. Wheat grows with the greatest luxuriance, and it is all accomplished by the skilful use of clover.

Now, we know by analysis that this clover plant is a great renovator of the soil. We want to have more clover introduced into the rotation in New England. I do not know any way in which we can introduce so much vegetable matter, so much manure into the soil, at so little expense, as in the cultivation of this plant, in a good system of rotation. It is well known that a ton of clover hay, fed to animals, is worth for the manure nine dollars, on account of the large amount of ammonia in it; ordinary hay is not worth half that. It is worth in manure, after it has passed through the bodies of animals, and they have gained their flesh and fat by it, nine dollars. If that is so, if science says that is true, we ought to cultivate clover hay. If we can have this rotation introduced on our farms, everything will be more profitable than now; and if men have faith in their business, and have faith to invest in it, (it is not going to cost a great deal to try this experiment,) let them sow clover, let them pursue this rotation, which is found to be so profitable in Pennsylvania, New Jersey and some parts of New York State.

Well, we not only want this rotation, but we want improved tools and machinery in our husbandry, and these will make farming much more profitable. For instance, the mower, the horse-tedder, the horse-rake and the horse-fork. With these four implements you can gather your hay harvest at an expense of less than three dollars a ton—make it and put it in the barn. With the scythe it costs double that, at the present price of labor; and the farmer who uses those improved tools of course can put his hay into market at much less expense than the man who uses the scythe and hand-rake. The old style farmer will be beaten out of his shoes if he does not get these improvements. He cannot afford to go on in the old track any longer; his neighbors will leave him far behind. And so with other implements. I was in Pennsylvania ten days, and I did not see a man in a cornfield with a hoe—not one. They do all the cultivation of their corn (except in very limited districts, which I did not see,) with the cultivator. I saw men riding on a sulky seat cultivating the ground and leaving it as clean as the hoe would, unless the land was very weedy and grassy, and going over ten acres in a day. Now a man cannot hoe much more than an acre a day with the common hand-hoe; and corn is raised in Pennsylvania for fifty cents a bushel, when it would cost to raise it by the hoe a dollar and a half. The man who uses these horse implements for the cultivation of his crops has a great advantage over the man who uses nothing but the hoe and ploughs a furrow between the rows in the old style. We want to invest our capital in these improved tools just as fast as we can get our land into shape to use them. In this way we can make our farming more profitable than it is.

And we not only want that, but we want better barns and farm buildings, in order that our crops and cattle may be sheltered, and that we may have the best facilities for making manure. I do not know how large a proportion of the cattle of New England are properly sheltered; I know there are a great many more put under cover now than ten, fifteen or twenty years ago; but, as I came up on the railroad yesterday, I saw a great many cattle in the fields and around the stack-yards, exposed to the cold and pelting storm of the previous night, and I wished that their owners had been compelled to spend the night out there in the stack-yard. There is no kind of doubt that it takes one-third more hay to support an animal at the stack-yard than it does under shelter, in a barn or hovel, and the animal does not come out so well in the spring as it would from the stable, with two-thirds the amount of hay. The husbandry cannot be very profitable that is pursued in so wasteful a manner as that.

We want barns that will furnish facilities for making and sheltering manure. I know barn-cellars have got to be very popular, but yet not half the farmers of New England have got cellars under their barns. I saw all along the line of this railroad barns standing as they did thirty years ago, with no facilities for making manures; and one-half the hay and provender cut on the farm is stacked and stands out exposed to the weather all through the winter. I was talking with a very intelligent farmer a few months ago, who was then stacking some hay, and I asked him what he thought was the waste of hay that was thus exposed in the stack, and he said: "At least one-quarter. Hay that you put into the stack will not go so far by twenty-five per cent. as that which you put in the barn. It loses its aroma, its sweetness, and there is a loss of one-fourth of all you put into the stack." That, he said, had been the result of his investigations, and he was going to build a barn, 80 by 40, with a cellar under it. If that is the case—if one-quarter of the hay that is stacked is wasted—farmers can afford to build larger barns. We want them to shelter our crops and animals and to facilitate the making of manures. When farmers will provide these improved barns and buildings farming will be more profitable than it is now.

I might say a few words upon farming on the water as well as on the land. We are coming to this—the raising of fish in our brooks—and I think it will be one of the most profitable branches of our husbandry. At present these waters are barren, or nearly so; but almost every New England farm—every hill farm, certainly—has its trout-brook, in which these delicious fish can be reared at very small expense, and the farmer not only supply his own table but the village or city market with these choice fish. Trout are now worth one dollar a pound, and sometimes they are as high as one dollar and twenty-five cents. All that can be sent to the city market will bring that price, because so few are engaged in the business. I do not know that there is anybody engaged in it. The dealers depend upon the supply that comes from what are called wild brooks, so that no man is regularly supplied with these fish. The enterprise has been started, and successfully started. I was recently at Dr. J. H. Slack's, in Bloomsbury, N. J., who has trout-ponds which have been going since a year ago last September. In one of these ponds he has, as the result of his last year's operations, 10,000 young trout turned out of his hatching-boxes. The fish are now about six inches long. He has in the next pond about two hundred that are two years old, and in another pond two hundred and fifty fish that were on hand when he began his operations. When I saw him, a few days since, he told me he had taken off 47,000 eggs, which he has in his hatching-box, and they are doing very well. He has not lost one per cent. of them, and calculates that when his establishment is fully going he can raise every year, in that little yard, perhaps about four times the size of this room, 50,000 pounds of trout, worth, at wholesale prices, not less than $30,000. It may, perhaps, cost him two or three thousand dollars to carry it on. He feels entire confidence in the success of the undertaking; and when those young men at the Agricultural College know how to go out and instruct our farmers how this thing can be done, fish farming will become one of the most profitable branches of industry. I have no doubt that, in all these ways, our farming will be made much more profitable than now.

Dr. HARTWELL, of Southbridge. I do not rise to controvert the least thing that the gentleman has said. I subscribe to the whole of it, with very few exceptions. His remarks to you in relation to agricultural education were most excellent—not to be improved. I rise for the purpose of giving you a few facts in regard to my own experience in farming. I was brought up on a farm ; I have held the plough, used the scythe, the fork, the rake and the axe, and I am proud of it. I have been engaged for half a century in a most laborious profession,—that of the practice of medicine ; but I never have lost sight of the farm ; I never have lost my interest in the farm ; it has been one of my darling employments.

About thirty years ago some twenty-five acres of poor land came into my possession, and I made up my mind to improve that land so that it would be worth something ; and I have done it. When I began, my neighbors said : "What are you going to do with that land ? Every day's labor will be lost." I underdrained ten acres of that land and took out the rocks. It cost me $100 to remove the rocks. I then ploughed it to the depth of seven inches, and then subsoiled it to the depth of seven inches more. This soil was naturally poor, sour and wet ; but, by underdraining it, I have brought it into such condition that it produces all I ever expect of it.

But there is one fact further which is more important than anything else. Look at our farms in New England, and see what they are now. The farmers must take them as they are. Now, what is the proportion of the land that has been cultivated and been under the plough ? I should think about twenty per cent. of the whole surface of the land in Massachusetts, and Massachusetts will perhaps serve as a sample for all New England. What are the crops that are produced upon these acres ? What is the proportion of the corn crop to the hay crop and the wheat crop ? The corn crop, a few years ago, gave about twenty-five bushels to the acre ; now it gives something like thirty or thirty-five bushels to the acre. The average hay crop has been less than one ton throughout Massachusetts.

The wheat crop has been about twenty bushels to the acre. That crop just about pays for the labor, and no more. It will cost you just about twenty-five dollars an acre, if you charge nothing for your manure. It will cost twenty-five dollars an acre for corn. Reckoning the old price, one dollar a bushel and one dollar for labor, you have made no profit. As farmers say, they make no profit; they must have means to bring up their crop to seventy-five bushels an acre. It costs no more to take care of seventy-five bushels than twenty-five, except a little more labor in husking. That is the only additional expense. I have had as high as one hundred bushels, but it did not pay. I would never advise manuring so rich as that, because you get your land too rich for your grain crop and grass crop. I have cut three tons of hay to the acre, but it is full high enough. Two and a half tons is about the maximum of hay which I would recommend any farmer to undertake to get; when he has a sufficient quantity of manure to go beyond that, let him increase his surface.

Now, in Massachusetts, I would not advise the putting of another acre under the plough beyond what is under the plough now. If you can by any means increase your manure, increase the product of what you have already under cultivation. But the great desideratum is manure, *manure*, MANURE. And where are we to obtain it? Gentlemen, I never could have raised this land of mine without foreign aid. I might have worked upon that land until I died, if I had only put back upon it what I took off; it never would have come up. There is land that will do it, but this is a poor piece of land. Poor land, such as is found on most of the farms in Massachusetts, cannot be brought up to any very great extent without the aid of foreign manures. Those who live near cities, and can buy their manures, can manure as high as they please; but we who live forty miles out in the country have no means of getting manures except these stimulating manures of which we have heard to-day—very proper, they say, excellent, to give your crop a start and make your corn look better in July than in October; but they don't allow that the beneficial results are seen at harvest. Stable-manure is effective—manure from cattle, and specially the manure from hogs, night-soil and hen-manure; but there is no manure so good, according to my observation, as the manure that is dropped from cattle that you feed with grain—stall-fed cattle. That is most excellent manure. The droppings of cattle in your pastures have a different appearance from the droppings of stall-fed cattle. Now, how are we to obtain this grain to feed to our cattle? Suppose we bring our corn from New York, Illinois, Michigan or Mississippi, and fat all the beef that we consume in Massachusetts—that would enrich our land; but would it pay? The farmers of Illinois say that hogs are the best sacks in which to carry their corn to market; and it is so. It is admitted that a bushel of corn makes about a pound of pork; then if we bring the corn here we pay for sixty pounds, and the man at the West pays for ten pounds. Now, the farmers of Massachusetts are greatly interested in having freight reduced from the West. I wish this Agricultural Board would express an opinion coinciding with that of the commercial men and Boards of Trade who are making great efforts now to procure the construction of a ship-canal from the Mississippi River to Lake Michigan, and a canal round Niagara Falls out to Lake Ontario, and a railroad from there to Boston. Now, if it was possible to have freight so low (which we can never expect) that ten pounds of pork would cost only a cent, and sixty pounds of corn six cents, there would be only a difference of five cents against us, in comparison with the Western farmers; which we could afford to pay, because we should have the manure to enrich our farms.

We have almost every kind of soil here in New England, and why are our farms so exhausted? I believe we must look back a hundred years for the cause. When Massachusetts was first settled the farmers went into the woods with their axes, cut down the trees and burned them on the ground, forty, fifty, or a hundred cords to the acre. That left a rich coat of ashes, which made abundant feed for their cows, sheep and hogs, and for all their cattle, through the summer; they had a pretty hard struggle to get them through the winter. About half a century ago our farmers in Massachusetts began to talk about the exhaustion of their pastures. They did not know the cause, but you cannot fail to see the cause. They had been drawing off the potash for fifty years, and had put nothing on. What is to be done with this land—with these sixty acres out of a hundred? There is a great deal of it which is sour, which is not in a state for the application of plaster of Paris or sulphate of lime, because it will do no good; it will do no good where there is the appearance of iron in your land, because there is already too much sulphate there. This land you can tell by simple observation, without any chemical tests. Look at the vegetation. There is one axiom of chemistry which you can always remember, and that is, that acids turn vegetable greens to red. I presume you will recollect having seen red plants at the side of the road where the land was well cultivated, and you will see upon the trees that grow upon such land something of the same appearance. It is the upheaved sulphur that is upon our land, and it takes so much manure and so much alkali to neutralize it that successful farming is nearly impossible. You may plant that land with corn, and put the ordinary quantity of manure on it, and it will not go to seed; but with sufficient manuring it may be brought up to be equal to the best land in the world, by being opened to the rains and having the sulphate washed off.

Another thing you will notice about sour lands. You will notice sorrel. That will grow for a few years, and be followed by white clover. It is the pioneer of something better. It is the pioneer for such plants as we want to feed our animals with, containing starch. The farmers in many parts of the country have left this old land. They did once cut off the bushes, but they found little profit in it. The feed was gone; the plants that grew contained very little nutriment, and consequently they have let it grow up to wood, and they have made money by it. An acre of land that produces a pretty good crop of wood will grow a cord a year. We should be thankful that we have no barren land in Massachusetts. We say our land is exhausted. It is not exhausted. It is exhausted for particular crops, but something will grow. The cone-bearing plants will grow first on this sour soil—the pines, the hemlocks, the spruces, the birches. These are an older race of plants than the maples, the chestnuts, the oaks; and these are filling your land for another rotation, if you choose to call it so. If you will wait thirty years, and then burn that land over as the early settlers did, you will renovate your land. I cannot recommend that way. But a great many of the farmers in my neighborhood have asked me what they should do with this land, and my invariable answer has been, "Let it grow up to wood." Wood is worth six dollars a cord with us, and there are more acres of woodland growing in Worcester County to-day than there were fifty years ago, although not so much wood. This sour land is selling for about ten dollars an acre, and it is a very good investment, if a man can wait thirty years for his returns. It does for a long, safe investment.

With regard to planting clover, it operates very well to the westward, but in our rough, rocky land there are but very few acres where we can do it. We have, however, some hills that are worth preserving. Those hills are natural grass lands, and they will produce clover for pasturage by the application of plaster of Paris. That land should be kept in pasture and mowing. But if you look around it you will find different land; you will find drift. I never saw any drift soil that would bear plaster. Now land which will bear plaster is worth four times, ten times, as much as that which will bear none at all.

A gentleman has spoken to us about the phosphate of lime that has been discovered in South Carolina. If it can be rendered available in the manner which I suppose it may be, it will be almost infinitely valuable; but if we can draw our manure from the Western States we do not need it. If we can raise our own beef and fat our own hogs we can enrich our State beyond bounds.

On motion of Mr. Hubbard, of Brimfield, the Board adjourned to 7½ o'clock in the evening.

EVENING SESSION.

At the hour appointed for the evening meeting, the hall was densely crowded, the audience having been attracted by the announcement that Prof. Agassiz was to be the speaker.

The Chairman, before introducing the lecturer, said :—

In introducing to you, ladies and gentlemen, the distinguished lecturer of the evening, it is hardly necessary that I should say a word. Standing pre-eminent among the great scientific men of the world, his name affectionately cherished wherever learning and science are cultivated, it is yet the pride of the Massachusetts Board of Agriculture that he is one of that body. I now have the pleasure of introducing to you Prof. Agassiz, a member of the Massachusetts Board of Agriculture.

THE ORIGIN OF THE AGRICULTURAL SOIL.

BY PROF. LOUIS AGASSIZ.

Mr. President, Ladies and Gentlemen,—On an occasion like this, it has occurred to me that a few remarks upon the origin of the agricultural soil would be in place.

It is unquestionable that all material upon which agriculture depends is the result of the decomposition of rocks; but I believe that there is a misapprehension upon this subject when it is considered in detail. It is believed by many that the soil which we till owes its existence to the rocks underlying the soil. That is not the case. There is hardly anywhere in the world an extensive tract of cultivated soil which has not been brought to the place where it exists from considerable distances; and I want to try to show you how that soil has been ground to powder and prepared for the purposes and uses of man. I allude here to the soil that has not yet been submitted to agricultural processes. I do not intend to include in my remarks the improvements which are made upon soil by manuring, nor the improvements which naturally result from the decomposition of the plants which in their wild condition decay upon that soil, nor to allude to the part which the decay of successive generations of animals contribute to that improvement. My intention is simply to allude to the origin of the unimproved soil which lay on the surface of the ground, forming the solid crust of the earth. And in bringing this subject before the Board of Agriculture and before those who feel an interest in their proceedings, it is my desire to suggest the propriety of making a geological survey of the agricultural ground as a means to improve agriculture. The State of Massachusetts has already ordered a geological map, which was executed in a most admirable manner by a gentleman whose scientific career has been spent among you in this place. I need hardly name President Hitchcock to recall one of the prominent geologists of America, and one who has done excellent work in popularizing science on this continent, and in making known to the whole civilized world the geological structure of the State of Massachusetts. But the work which President Hitchcock performed in that manner embraced only the rocks which form the solid foundation of the country; it was only in his later years that he turned his attention to what he called "surface geology." And here again he has been the pioneer in our science, for what little is now known of surface geology we owe chiefly to his labors. Yet there is an immense amount of work to be done in that direction, and I hope the day is not far when another survey shall be ordered, which will include an investigation of the surface materials which constitute primarily the soil on which agriculture is carried on.

It is no doubt the case that the rocks are decomposing in places constantly; and the amount of this decomposition is very great, varying according to climate, and is the result of influences which are also different under different climatic conditions. In our colder northern regions the decomposition is owing chiefly to the filtration of water into rocks, to the frosts following that infiltration, to the splitting of the surface of the rock into fragments in consequence of the expansion of frozen water, and thus the disintegration of the rocks themselves. In more southern climates, where warm tropical rains are incessantly pouring upon the hard rock, it is chiefly that agency and the decaying of the rock by the heat of the tropical sun which produces a similar result. And yet this process, extensive as it is, is not the chief cause, hardly an extensive cause, of the production of agricultural soil. There is another cause which ought to be taken into account—the wearing of the rock by the action of running water. Here again we have an accumulation of an immense amount of loose materials which are the result of the wearing action of running water. And yet even that is only a small portion of the amount of loose materials which are scattered over the earth and form part of the agricultural soil. The main mass of the agricultural soil is derived from an entirely different source, and is produced by an entirely different cause. There has been at work a grinding machine more powerful than the action of the sun, of water, of frost or of wearing currents. It is the agency of ice; and to that agency we owe not only the grinding of the rocks to powder and all the comminuted material which forms the chief portion of the loose coatings above the rocks which serve as the basis for our agricultural operations, but we owe also to that natural machinery the mixture of rocks derived from different regions, which have formed the compound coating over the whole surface of the earth, without which agriculture would be limited to those regions the rocky foundation of which is such as to afford a suitable soil. The agency of ice has been such as to bring together from remote countries the loose materials from the limestone rocks, the slaty rocks, the marl beds, the granite rocks, and the wearing of those materials into paste has transformed them into that coating which really constitutes the bulk of our agricultural soil. Those materials have been remodelled since by atmospheric agencies ; they have been rained upon since the time they were deposited, and of course the action of water has carried far off to other places what had been first worked upon by ice. But this is not very extensive and does not constitute a part of the primary formation of agricultural soil.

It would lead very far to enter into an extended discussion of the manner in which ice can have produced these results. It would probably excite a smile if I were to begin by saying that the whole extent of the United States has at one time been covered with a sheet of ice many thousand feet in thickness ; and yet geology can show that it was so. It would probably excite doubt if it were stated that the whole sheet, moving from the north in a southerly direction, has ground the loose materials resting upon the surface of the earth to that paste which constitutes the agricultural basis ; and yet it is so. It has been by a succession of observations, starting from small beginnings, that this result has been reached and is now recognized as a fact among geologists ; and in order to give you some idea of the process, I will state what I know of operations of this kind which are still going on at the present day.

It is not my purpose to explain to you the physical laws regulating the formation of glaciers. It is not my purpose to show what are the causes which set those masses of ice in motion in those regions where there are glaciers still in existence, for that would occupy more time than I have before me. I want only to speak of ice as a geological agency, and to show you what connection exists between the former extension of ice-fields over the northern continents and the preparation of the earth for the purposes of man. Masses of ice have existed which once covered our continent to a latitude the southerly limit of which we hardly know precisely, and which have equally covered the southern hemisphere to a latitude northwards which is also not yet determined ; but I say these masses of ice have existed, and can be tracked, and the way in which we track them is unmistakable. One who is familiar with the facts can as readily recognize the course which those masses took as the hunter can trace his game by recognizing the footsteps, and knowing the animal which has left his mark upon the soft soil.

At present we have glaciers only under peculiar conditions. We have them only where the land is above the surface of the ocean, so high that the average temperature is below 32° Fahr., or where, in the northern latitudes, the average temperature sinks regularly below that level; so that at present there is a cap of ice around the northern pole, another cap of ice around the southern pole, and all the high mountains are capped with ice. And these ice coverings move in definite directions, according to the amount of moisture which penetrates them. The accumulation of ice or snow is not an agency sufficient to produce a glacier; it must be accompanied by an infiltration of moisture, otherwise the snow remains loose and produces no mechanical action. It is only when the snow, through partial melting, or through dew or rain, or the condensation of the moisture from the atmosphere, has been softened, and then frozen hard again, that the snow passes into the condition of ice, and then begins to produce a mechanical action, which is all-powerful, as we may see at present in the Alps, in particular, where the glaciers have been studied more extensively than anywhere else. Suppose we have a mountain-slope of from nine to fourteen or fifteen thousand feet above the level of the sea. The condensation of moisture from the atmosphere which falls from this surface will remain in the condition of snow over the whole of this extent, for here there is hardly (except perhaps on hot summer days) a condensation of moisture in any other but a frozen condition. It does not rain. The sun is not powerful enough, in the latitude of Switzerland, for instance, to produce a rain-fall at this height; but the condensation falls always in the shape of snow. When we come to lower levels (and this process is gradual; the limit is not absolutely nine thousand feet) we have a region where the alternations between snow and rain are frequent, and in consequence of this condensation of the atmosphere in a fluid condition the snow is permeated by water, the cold nights come on, the moisture freezes and gradually transforms the snow into a loose kind of ice; and as we go lower down we find that the process, on account of the larger amount of moisture, becomes gradually more complete, until, at the lower end of the glacier, we find that the ice is as solid as frozen water. But no part of the glacier is the result of the freezing of water, as such; it is the result of the slow transformation of snow into ice by the process just explained.

Now, while the loose snow resting upon the rocks fourteen thousand feet above the level of the sea is brought down by its own weight, (the direction of which is determined by the slope,) it produces no mechanical action, in consequence of its looseness; it only gradually comes down. As soon, however, as the snow is transformed into ice, becomes more and more solid, it moves as a mass, and no longer as an accumulation of grains. It is like a mass of snow which rolls gradually down to a lower level until it becomes like a solid mass, which is pushed forward upon a solid basis, and from that time it begins to exert a mechanical action; and that mechanical action consists in pushing forward, in rolling under its mass, those loose materials which are broken from the solid foundation. So we have our process beginning, which consists in the grinding of the loose materials which are below the ice. It would seem as if those materials would soon be exhausted, and as if presently the mass of ice would have nothing but a smooth surface over which to glide, and no longer continue this process. But let us have a transverse section of the same valley, [sketching it on the blackboard.] We have here a mass of snow occupying the lower portion; its walls, exposed to the atmospheric agencies, are all the time disintegrating, and, in consequence of that, fragments of these rocks fall down between the snow and the rock, and, as the mass of ice is moving on gradually, these loose materials pass between the ice and the rock, and are contributing constantly to increase the amount of grinding materials which are provided to enable this gigantic rasp or plough to continue its work. And so we find at the lower part of the glacier an immense amount of loose materials, all ground to powder, when the fragments have been worked upon for a sufficient time, or reduced to smaller fragments, if the process has been continued for a comparatively short time.

Now, these materials have certain characteristics by which they can be easily distinguished from any loose materials worked upon by water. You examine, for instance, the loose materials which lie upon the beach, and which are tossed about by the tides and by the currents. These loose shingles are water-worn. They have smooth surfaces, it is true, but they are made smooth by the successive pounding of the fragments against one another. Their surfaces become smooth as you might smooth a stone by hammering it for a long time. You may continue to hammer it until the surface is very smooth, and yet you will not give it a polish in that way. In order to obtain your polish you must have a rubbing over the surface by a body which moves at a different rate from that of the body which is submitted to the process. That is what takes place under the ice. The fragments of rock are held by the ice, at least for some time, just as a precious stone is held in its setting, firmly, and then moved over the rock, and the surface which is brought into contact with the rock is thus polished. Those materials which have already been ground furnish a kind of paste, which adds to the polishing power of the rock, and the harder materials will produce scratches upon the polished surface. Now, the loose pebbles which you find under glaciers have a polished surface, and have scratches over them, in various directions, owing to the fact that these loose materials may be turned in their setting as the mass of ice moves on, and therefore every side is in succession brought into contact with the immovable rock, and thus they are equally polished on all sides, and scratched in every direction, by lines which cross one another in every direction. Such pebbles as you find with this appearance under the surface of the glacier you never find in a stream or current of water, because the action is different. There is nothing in the current to hold the stone in a fixed position, and therefore no possibility for the stone to be polished. But while these loose materials are thus ground and polished and scratched, they are working upon a solid, rocky foundation which is immovable; and upon that immovable surface they in their turn produce a mechanical action, and that mechanical action consists in wearing the surface to a smooth, even plain, and in polishing it and furrowing it and grinding it in the direction in which the motion takes place. In a valley which comes down from a high elevation to a lower level the whole bottom and sides occupied by the ice are filed away, polished, scratched and grooved, and the grooves are in the longitudinal direction of the valley.

Now, by the character of this polished surface, by the uniform direction of those furrows, you can determine the course which the mass of ice has taken; and this is one of the signs by which you can recognize the former presence of glaciers, where they no longer exist; and that they have extended beyond their present limit in times when the surface of the earth had other climatic conditions from those now prevailing in the same localities, is demonstrated by the fact that at the lower end of the glaciers of Switzerland you see these same materials in the bottom of valleys no longer covered by glaciers. You see below them, wherever they are removed, the bottom and sides of the valley polished, scratched and grooved in the same manner as under the glaciers; so that you can ascertain, with perfect certainty, from the continuity of these marks, how far the glaciers did extend. That this is the same agency, and that you cannot ascribe what is beyond the glacier to any other cause than the action of the glacier, is proved by the continuity of the phenomena. I have examined the surface under glaciers; I have repeatedly penetrated under them, following the lines which the water oozing from their extremity produced. I have frequently descended through crevasses into the sides of the glacier, and ascertained by my own eyes how this polishing and grinding are produced. I have seen occasionally, in the morning, the powder which resulted from the grinding of this machinery still remaining in the groove which had been made during the last twelve hours; so that about the fact of the glacier being capable of producing this result there can be no doubt. And I have sought everywhere, by the seaside and in water-courses, for similar appearances, and failed to find them anywhere; so that I am prepared to affirm, in the most emphatic manner, that water will not produce the same results that ice will.

But that is not the only sign by which we can recognize the glacier. On the surface of the ice there is accumulating, at some points, a larger amount of the loose materials than is passing under the surface of the ice, and walls five, ten and sometimes twenty feet in height accumulate upon sides of the glacier, and they are carried forward, perhaps more slowly than the materials underneath, but yet carried forward down into the valley; and how far they have travelled can be ascertained by tracking the varieties of rocks to their origin. You will find in these walls a combination of granitic materials mixed with black slate, and wherever there is any particular rock there is no difficulty in tracking it to its place. In the glacier of the Aar I have tracked some of these rocks from the point where they broke loose to a distance of seventeen miles upon the sides of the glacier. To that extent the evidence of the precipitation of this loose mass by the glacier was as direct as could be.

But it is not at the lower end of the glacier that these loose materials stop. We find them further out. You will find this same black slate down the bank of the Aar, at Meyringen, which is about twenty miles from the end of the glacier; so that we have here evidence that these loose materials have been carried thirty-eight miles, to Meyringen, by the agency of ice; for through the whole length of the valley you may track these polished, grooved and scratched surfaces to the very place to which I have just alluded.

One word more about the glacier itself. At a certain level, where the atmospheric currents are so warm as to counterbalance the onward movement of the ice, it melts away, so that the glacier begins as snow, that snow is transformed into loose ice, is finally transformed into solid ice, and at a certain level it melts as water and forms a stream, which flows further on; so that in the glacier we have three stages—the snow stage, the ice stage and the water stage. Now the water, when it begins to flow, acts upon the loose materials which have been ground by the ice, and the manner in which those materials may be rolled tends to lessen the distinctive marks which had been impressed upon them by the glacier, so that at some distance the amount of pebbles that are polished and scratched is greatly less; and when these materials have been worn by the current for a long time they cease to have, to the same extent, that uniform character, showing plainly that the current is not the cause of the appearances which we observe on the loose materials higher up, since the action of the current is to efface those marks.

Besides these walls of loose materials on the side of the glacier, we have still another appearance. Suppose that we have two glaciers, coming from two mountains, and uniting into one.

[Illustrated by diagram.] Each glacier has upon its side such a wall of loose materials, and when the two glaciers unite into one, the two walls of the combined glaciers unite into one, and instead of being on the margin of the glacier, they are on the top. These walls of loose materials are called *moraines*. It is a local name, given by the peasants to these loose materials in the Alps, and that name has been adopted by geologists, and is now current in the whole scientific world to designate these accumulations of loose materials which accompany the glaciers upon their sides so long as they are single, but which may be on the surface where two glaciers have united into one. Suppose you had two rivers on which wood was floating, and those two rivers should unite into one current, and suppose that the two rivers, at their junction, should carry different kinds of timber, when they united, you would have, along the middle, a mixture of the two kinds of timbers, maintaining a middle course, while the materials on the two sides would be of different kinds. So, when two glaciers united, you would have in the middle a mixture of the materials of the two moraines, while upon one side you would have only the materials that fall from one mountain, and on the other side only the materials that fall from the mountain on that side. Now, as the mass of ice is not tumbling over from one side of the valley to the other, but is a solid mass, which moves steadily through the depression in the surface, you see that there could be no mixture of the different moraines, as would be the case with timber floating upon a river, but the three walls of loose material follow an independent course. Now, upon the sides of these Alpine valleys you can track these lateral moraines for as great a distance as you can track the loose materials which are at the bottom of the glacier and the polished and scratched surfaces which accompany them. So that here we should have a lateral moraine following the ice to Meyringen—that is, for thirty-eight miles from the origin of the glacier—and the middle moraine, which moves upon the middle of the surface of the glacier where the glacier terminates, would drop from its edge and fall to the bottom and there form another kind of accumulation. The three moraines fall in different places, and there is a transverse wall at the end of the glacier formed across the valley. You see that no river could form a transverse wall across the valley through which it flows; but the glacier forms such a transverse wall of loose materials at its very termination. Now such transverse terminal moraines I find along this valley; one at Meyringen, another over opposite, just across the valley, another at the Hospice of the Grimsel, another about a mile from the termination of the glacier, and one at the very termination of the glacier, showing the successive positions which the glacier has occupied. It is now in such a condition that its termination remains about stationary. Near by, the glacier of the Rhone is more influenced by the inequality of the temperature of successive years, so that one year the glacier advances and another year retreats. In consequence, we have, at every termination of the glacier of the Rhone, one of these concentric moraines, thirteen in all, close one upon another, the farthest of which shows no sign of vegetation; the second has a few herbaceous plants growing on it; the next a few shrubs; the next a few trees, the size of which indicates about two centuries of growth, showing that about two centuries ago the termination of the glacier was at this point; and we know from history that there was a very severe period, when glaciers could advance much further than now. Since then it has been alternately advancing and retreating, until it reached the place where it remains now.

In order to have reached twenty-one miles further down than its present termination, the glacier of the Aar must have been thicker than it is now. It terminates about six thousand feet above the level of the sea, and there the polish is very fresh; but just above it you see that the wall of the valley is also polished and scratched, and as you go lower down you trace this same polish upon the same side of the valley, to a greater and greater height; so that at Meyringen the level at which the walls of the valley are polished is five thousand feet above the bottom of the valley; which shows that there was a time when the glacier of the Aar, which is now only a thousand feet thick at its thickest part, and less than three hundred feet thick at its lower end, was five thousand feet thick, and for the whole length of that you have the surface of the valley polished, scratched and grooved; and wherever the walls exhibit inequalities you find that on those little terraces there are lateral moraines accumulating. These lateral moraines begin at a level of nine thousand feet above the bottom of the valley, and there are others at a level of seven thousand feet, and still others at a level of five thousand feet above the bottom of the valley.

Now, by the polished surface of the bottom of the valley, and the polished and grooved surface of the sides of the valley, and by the lateral moraines formed upon the terraces on the sides of the valley, and the transverse moraines observed at the bottom of the valley, across the valley, we can determine the successive stages of any one of the glaciers of the valleys of the Alps. And that survey has been made. It was begun in 1825 by De Charpentier. I took up the subject in 1827, and, with Prof. Guyot, surveyed nearly the whole surface of Switzerland, with a view to ascertain what had been the extent of the glaciers at the earliest time of which we could obtain information by this method; and we ascertained that they had not stopped at the lower part of the Alpine valleys; that they had not stopped at Meyringen, but had followed the inequalities of the Alpine slope down to the plain of Switzerland. Nor did they stop there. They crossed the plain of Switzerland and reached the plain of the Jura, twenty-five miles to the north of the Alps. So there was a time when the masses of ice which occupied Switzerland filled the whole basin of Switzerland, from the Alps to the Jura, and ascended the Jura to the height of three thousand feet. Here, then, is as positive evidence as we can wish that at one time the whole extent of that country was under ice.

With that information, I went further. I visited in 1840 the British Isles, and discovered traces of the glacier in Scotland, in England and in Ireland, and satisfied myself that that country at one time had been entirely under ice. Similar observations were made by other investigators, and, in consequence of all these observations, the conviction gradually prevailed among geologists that Europe had at one time a much colder climate than now, and that the boulders of Scandinavian origin which were found in northern Germany had been transported from Norway and Sweden, across the Baltic, by masses of ice extending from the North Pole across these regions to the more temperate portions of Europe; and gradually the evidence has been obtained that an ice period once prevailed upon the surface of the globe, during which the continent of Europe was all under ice. The evidences by which this conclusion was reached are those to which I have alluded—the polished surfaces, rounded materials, the surface of which is smooth, polished, scratched and grooved, and the solid foundation of the rock over which these materials are moved, which exhibit polished, grooved surfaces, just like those under the glacier now. These grooves all trend in a north-southerly direction, and the nature of the rocks favors the idea that the transportation has been from the north to the south. So that here is found the machinery which has ground these loose materials, and the result has been the grinding down of the rocks into a kind of paste, wherever the loose materials were soft enough to be ground to powder, and with that powder a mixture of loose materials in which there is no arrangement in accordance with their weight. You find in these accumulations of glacier wall materials minute pieces at the very contact of the rock, larger and larger pebbles through the whole mass, and on top perhaps the very largest; and wherever you find large angular boulders, they are always on top of the whole. And why is that? Because the large angular boulders travelled on the back of the ice, and were not submitted to any friction, while the loose materials which were under the ice were pressing against each other, and were under that great friction resulting from the superincumbent weight. The materials on top of the ice were carried on, floated down, as it were, without friction, and therefore did not lose their angles; and wherever the ice melted away, these angular materials came down, and are now found resting everywhere upon these ground, rounded and polished materials.

Now, this same agency has been at work on this continent. When I first reached the coast of America, at Halifax, the steamer stopped for a few hours, and I ran up to the fortress and there saw, in a moment, all those signs which were so familiar to me. I saw at once that the same agency had been at work there, and since that time I have tracked this force over the whole continent. From the coast of Nova Scotia to the foot of the Rocky Mountains there is not a foot of solid rock exposed, which has been disintegrated by the agency of the atmosphere, which does not show these marks of the working of ice. Everywhere are the newly-exposed surfaces polished, grooved and scratched, and the direction of this engraving is everywhere from north to south, deviating sometimes a little to the east or the west according to the lay of the land. Everywhere we find, in immediate contact with those solid materials, more or less of the loose materials of the glacier wall, sometimes five, ten, fifteen or twenty feet in thickness, sometimes as thick as one hundred, two hundred, three hundred feet. The whole prairie is nothing but a glacier bottom. I have spent, this summer, several months in the exploration of that country, with the special object of ascertaining the character of the loose material constituting the Western prairies, and I have satisfied myself that from the Rocky Mountains to the Atlantic Ocean the whole mass of loose materials, sometimes hundreds of feet in thickness, is nothing but an accumulation of glacier wall materials. The whole of that has been ground by the ice rasp, and we owe, therefore, these loose materials, which are the basis of all our agricultural operations, to the work of immense sheets of ice.

There was one difficulty in accounting for the motion of such a sheet of ice over a flat surface, for from the North Pole to the Gulf of Mexico we have not a natural slope. When I first affirmed that the drift of North America was the result of the working of ice, geologists thought it could not be, and did not adopt my conclusion. They denied it on theoretical grounds. They would recognize the similarity of the accumulations to those observed under the glacier; they would recognize the similarity of the polished surfaces to those which are now observed under the glacier; but they said that glaciers could not move over a level surface, and that therefore some other still unknown cause must have been the agency which produced this result.

Now is the motion of ice the result of a slope? I say, no. I say that ice moves, not in consequence of the inclination of the surface on which it rests, but owing to the climatic condition. The slope of the mountain valleys no doubt accelerates the rate of the onward movement of the glaciers, but were it not for the penetration of the snow by water, were it not for the transformation of the snow into ice, and for the constant dilatation of that ice in consequence of the freezing of the water which penetrates it, there would be no other motion than subsidence, and therefore even there we should not have the results which we observe. The motion of ice is essentially a climatic and meteorologic action, and not the mere action of gravitation; and if we now consider the fact that in different latitudes we have different climatic conditions; that in the north we have a small amount of moisture falling in a fluid state upon the earth's surface; that we have to come to our latitude before we find a climate which will produce alternately, at different seasons, rain and snow, and we come finally to a climate further south where no snow falls, but only water, we shall find that those climatic conditions are so similar to those which now operate upon the glaciers of the Alps, that we can have no doubt that to those conditions alone may be ascribed the movement of the accumulated snow of the north in a southerly direction, in the same manner that we have now in the Alps a downward movement of the snow into the lower valleys of the Alps in consequence of the transformation of snow into ice. I have no doubt of this; and what confirms me in this opinion is the great thickness which these masses must have had in former days. If we have no great mountain chains from which these masses of ice can have descended, we have at least mountain chains sufficiently high to tell us to what level the action of ice has reached; and in the White Mountains I have found that up to the height of five thousand feet the mountain slopes are polished, grooved and scratched. In Maine I have not seen a hill the top of which is not glacier worn. But notwithstanding these inequalities, the mass of ice must have moved evenly southwards. Now, beginning at Katahdin and moving southwards towards the ocean, we have a succession of hills which trend in a north-east south-westerly direction. On all these hills we observe the scratches and grooves, as if these inequalities were no obstacles to the mass of ice. That is, after passing one slope and coming down, they ascend again and come down again, and rise again, until they reach the seashore. Now a glacier does not move up and down hills, but it moves evenly over inequalities. In the valley of the Aar, for instance, we have several hills, the sides of which are evenly polished and smooth, showing that the glacier, when it was five thousand feet thick, moved over those inequalities, just as a stream moves over the inequalities of its bed without being stopped by those inequalities. But the stream would not flow over them if it did not rise above them; and so must this mass of ice have been thick enough to move over these inequalities without meeting an obstacle in the height of those hills. Some of those hills are fifteen or eighteen hundred feet high. I take it, therefore, that the sheet of ice which moved over them must have been five or six thousand feet thick in order to proceed in a southerly direction without being obstructed by those hills.

Now let us see how we can account for the general motion from north to south. I need hardly repeat that over the whole of this surface we find solid rock, evenly polished; we find everywhere these scratches and grooves—sometimes a groove a foot in depth and as wide, or a foot and a half in width, and from that down to mere scratches, such as a diamond would make upon glass, all this being the result of the inequality of the dimensions and hardness of the materials which were imbedded in the lower surface of the ice as it moved on.

But now let us have this as the equator, [making a sketch as he proceeded,]—this as the curve of the northern hemisphere of the earth,—this is the latitude at which only snow falls,—here the latitude at which snow and rain alternate,—and here the latitude at which, now-a-days, only rain falls. The amount of snow which accumulates at the extreme north will not be transformed into ice to the extent to which it will be transformed further south. We find greater glaciers in Greenland than we find further north. In one word, we find that the dimensions of the glacier are proportioned to the amount of fluid moisture which may condense from the atmosphere. Now, in the days when the climate of Switzerland was so cold as to cause the formation of a sheet of ice of a thickness five thousand feet greater than any of the glaciers now existing, when the whole plain of Switzerland was under ice, and when the northern portions of Europe were covered uniformly by one sheet of ice, moving southwards, the climate of the adjoining continents cannot have been warmer than the climate then prevailing in Europe. We must have had the same intensity of cold on this continent as existed there. We must, therefore, have had a condition favorable to an accumulation of snow in the northern hemisphere, which may have extended much further than any glacier now in existence, and under those conditions I suppose that the sheet of ice might have extended to the United States and to the Gulf of Mexico. I have traced the polished surfaces down to Alabama; therefore I am satisfied that at one time that sheet of ice extended as far as that. And to have extended so far, we cannot assume that the accumulation of snow in the polar region can have been less than ten or fifteen thousand feet in thickness; and this mass must have been pressed towards the south, and have moved in a southerly direction.

Whether that explanation be satisfactory or not, there is one thing which is within the limit of observation—that over the whole extent of the United States we find these polished surfaces exhibiting the same character as the surfaces which we have under the glacier. Over the same extent of surface, we have everywhere the loose materials which I have described, with the peculiar character which distinguishes glacial action from river action. To the same extent do we find angular boulders resting upon surfaces which could not have been transported in the same manner as those which are around them, and which, therefore, must have floated, as it were, over the rest of the mass.

Now, how could large boulders be floated in a current, and the loose materials be at the bottom? If it was an inundation, if it was an "earthquake wave," as it is sometimes called, that spread over the whole of this continent, and carried these loose materials from the north, I ask why it is that the heaviest materials, the only ones which are angular, are always on the top of the sheet of those loose materials, and that towards the bottom you have the most minute ones? It is impossible to explain that by the action of any current; but the moment you assume that a sheet of ice has been the working agency, you see at once that below it you will have a grinding, crushing and pounding, and above it the transportation of loose materials, which undergo no friction; and when the mass of ice melts away you will have these heavy materials, which are angular, resting on top of these more minute materials, which are ground and polished. Therefore you explain the facts by the theory which I advance, while no other theory has yet accounted for it. And you account for another series of facts, which are utterly unaccountable otherwise. After these immense sheets of ice had been formed, they melted away, for they are no longer there, and in melting away they produced large currents of water. Just as now, at the lower end of glaciers, we have everywhere streams issuing and flowing onward, so on the southern edge of that sheet of ice there were streams forming, and in proportion as the mass melted farther northwards the melting process became more and more rapid, larger masses of water were produced and larger freshets, larger inundations were produced, and the loose materials which were minute enough to be carried by the current were moved forward, or southward. And in the Southern States we find that we have loose materials similar to those at the North, but which have lost their glacial imprint, and are scattered in the way in which floods would scatter them, where the materials are sorted, as it were, according to weight, as they would be sorted in a current. You find in the lower part of the valley of the Mississippi such accumulations. You find them in the estuaries of all our rivers, and you find that all our great streams have terraces upon their sides which are never reached in the heaviest freshets in our days. The climatic conditions of our continent are such that at no time do our rivers swell to the height of their highest terraces. Whence did the water come in those days? It must have come from some source. It certainly was not the consequence of atmospheric condensation, since for ages the condensations of the atmosphere have never reached that level. But they may have been the result of the rapid melting of the northern glaciers. When, for instance, the sheet of ice which once extended to the Gulf of Mexico had melted away to the latitude of Washington, you see at once that the Mississippi valley would be flooded by an amount of water far greater than that which flows through it now, and thus the terraces upon its sides which form the bank at Natchez might then have been accumulated. When that sheet of ice had melted to the latitude of the White Mountains, then the Connecticut Valley would be swelled to the height of its highest terraces, while it could not be flooded, under its present conditions, to that height. When that ice melted further away to its Arctic limits at the present time, the equilibrium which prevails now was established, and from that time forward we had no other modifying influences operating upon these loose materials than those of the regular atmospheric agencies, as meteorology makes them known to us now. So that you see that all these various and complicated facts, which find no explanation in the idea of currents or freshets, are explained in a natural connection; and that adds great weight, in my estimation, to the theory which ascribes the formation of all these loose materials to the agency of ice.

But now, if that is true, there comes a work to be done which will be very interesting to the agriculturist. These sheets of ice have moved over rocks of different mineralogical composition. When these sheets of ice moved from the north over Vermont and then over our State, they passed successively over granitic, over limestone, over slaty regions, and, grinding all those materials, made a paste which consists of a mixture of the elements of granite, the elements of slate, the elements of limestone. When they passed through the more Western States, they passed over a more extensive limestone and clay region. The amount of quartz material is less, because round to the north of the State of New York there are not such extensive tracts of granitic rock as we have to the north of us. Hence the soils of those Western States contain a larger amount of limestone than ours; but they contain also silicious materials, the result of the decomposition of granite, mica, slate, gneiss and like rocks, because there are some such rocks to the north of those States, and therefore there is a similarity in the component elements of the agricultural soil of every Northern State, and the differences are accounted for by the different masses of rock to the north of the spot where we carry on our investigations. It would be a matter of great interest to survey these accumulations of loose materials all over our State, with a view to ascertain the composition of the paste, the nature of the fragments of rock which remain unbroken, which are only worn to smaller dimensions and have not been ground down to powder, and which would give us a general analysis of our soil, preparatory to the more minute analysis of each locality.

The later action, arising from the flow of water over these surfaces after they had been uncovered—that is, after the ice had melted away—is seen in the precipitation of more minute materials to lower levels. All our river basins exhibit a great amount of boulders and large fragments, and these large boulders have been pointed out as evidence of the stupendous action of the water. I say that they testify just the contrary—to the inability or to the want of power of the currents to carry them further. The water-courses have only carried the loose materials of smaller dimensions and made the river bed; the large materials which were in the drift have dropped to the bottom and remained inactive. In all our gravel pits you see at the bottom large accumulations of boulders, where, when the excavation was begun, it appeared there was only gravel. Why is that? Because the gravel has been removed and the large boulders left. That is what our rivers have done, and the very presence of large boulders in our river beds in greater numbers than seem to exist right and left is only the evidence that the river had not power to remove those large boulders, and cannot be adduced as evidence of the transporting agency of water. By examining the action of these superficial waters we obtain information of the very nature of the deposits which were formed by currents, and therefore, if we knew the general character of the drift from one State, we would at once have gained very valuable information concerning the deposits formed of these minor materials which have been accumulated elsewhere. It would be an expensive task, but one worthy to be encouraged, and which I have no doubt would be of essential service.

Prof. GAMGEE, at the request of several gentlemen, was invited by the President to give an account of his method of preserving meat, which he did, to the evident satisfaction of the audience. The substance of his remarks will be found embodied in the address already given.

At the conclusion of Prof. Gamgee's remarks the meeting adjourned.

THIRD DAY.

THURSDAY, December 10.

The Board met at 10 o'clock, and Capt. JOHN B. MOORE, of Concord, was elected Chairman for the day.

Capt. MOORE, on taking the Chair, said:—

Gentlemen of the Board of Agriculture,—I am much obliged to you for the honor you have conferred upon me in electing me to preside over your deliberations to-day. Without attempting to make any speech, I will endeavor to do my duty to the best of my ability.

I have the pleasure of introducing to you Mr. X. A. WILLARD, of the "Utica Herald," a pioneer in the efforts to enlighten the community in regard to the production of butter and cheese.

THE DAIRY AND ITS PRODUCTS.

An Address delivered at the Meeting of the Mass. State Board of Agriculture, at Amherst, December 10, 1868.

BY X. A. WILLARD, A.M., OF HERKIMER CO., N. Y.

Mr. President and Members of the Massachusetts State Board of Agriculture,—I am told there are large tracts of land in Massachusetts adapted to the dairy, and it is a matter which concerns the prosperity of the State whether this branch of farming promises to be remunerative and enduring. The true dairy lands of America are somewhat limited in extent, and it is believed by many that the time is rapidly approaching when the demand for dairy products will be largely in excess of production. Last year, (1867,) though the make both in Europe and America was the largest ever known, it was not beyond a healthy consumptive demand, while the product both of butter and cheese this year, on account of the severe drought in Great Britain, it is thought, will be much less than what is really needed.

The history of Eastern farming goes to show that no character of farm lands has increased in value in the ratio of that in the dairy districts. I am not prepared to say whether this rule holds good here; but the time will come, I apprehend, when the dairy lands of Massachusetts, location and other things being equal, will command the most money.

In making this comparison, farming lands, in the ordinary acceptation of the term, are meant.

Lands covered with hop plantations, with vineyards or orchards, or in the vicinity of cities, where market-gardening is in successful operation, owe much of their value to their improvements, and cannot, therefore, be counted in the comparison.

It is alleged that the true grazing dairy lands are more valuable than grain lands, because, first, they are of more limited extent; second, the grasses have fewer enemies to contend with, and give the most reliable results for any series of years; third, that dairy farms can be carried on at less expense; that they are constantly increasing in fertility; that the products of the dairy are earlier and more readily turned into cash; that the product of the farm is concentrated into a small compass, and hence the cost of transportation is reduced to the minimum;

and, lastly, that an increased and permanent foreign demand renders prices stable, so that the dairy farmer can nearly always count upon the income from his farm.

The Herkimer County farmers claim that there has not been a failure in the grass crop of the county for thirty years; that is, that during that time there has been no necessity for turning off the herds for want of pasturage nor the importation of hay or fodder for their winter keep.

For the last twenty years I have had personal observation of the cheese crop of the county, and in no year has it failed, though of course some seasons have been marked as giving below the average yield, but none so markedly poor as to be called a failure.

I have referred to the claim that the labor expense on a dairy farm is less than that for grain. I have known of many instances where one man and one woman have done all the work on a farm carrying thirty cows, except the employment of an additional hand for a couple of months in haying and harvesting.

The more usual course among those who rent farms carrying from thirty to forty cows is to hire a man for six or eight months—perhaps a girl for the same time in the house, if the wife is not strong, and cheese-making is to be conducted on the farm. I cannot say that this always is the best course, or that more profits might not be secured by a judicious outlay of more manual labor; I only mention the fact to show that an hundred acres in pasture and fifty acres in meadow are managed with less labor than if the same were devoted to other crops than grass.

The average annual receipts on good dairy farms at the East, at present prices of dairy products, are from twenty to twenty-five dollars per acre.

Before proceeding to give in detail some of the methods found to be successful in dairy practice, it may be well to review in brief the present condition of the cheese interest in this country and Europe. From the figures which I shall present, the farmers of Massachusetts will, I trust, be able to see more clearly what inducements are offered in turning their attention to this branch of farming.

It is only quite recently that the dairy has become an important branch of national industry. During the past eight years it has been rapidly spreading over new fields. It is engaging the attention of farmers in the Eastern, Western, North-Western and Middle States, wherever lands are adapted to grazing and there are streams of living water.

American dairying now represents a capital of more than $700,000,000. The cheese product last year, (1867,) sold for $25,000,000, and the butter product for at least an $100,000,000. In 1864 the butter product of New York alone was nearly 85,000,000 of pounds, and the quantity of cheese made, 72,000,000 of pounds. The value of these products, at a very moderate estimate, was then $50,000,000.

The wheat crop of New York in 1864 was 6,000,000 bushels; oats, 19,000,000; rye, 2,000,000; and corn, 17,000,000. The product of New York dairies therefore sold for more than the entire grain crop of the State.

The wool clip of the State that year was not quite 16,000,000 pounds, which, at a dollar per pound, would amount to no more than one-third that from the dairy. There has been a large increase of dairy farming in New York since 1864.

Looking carefully over the census, I fail to find any other agricultural interest in the State that can begin to measure arms with the dairy; for, if we add the value of pork made from whey, the calves raised and the beef and milk sold, we can hardly get the annual product from the dairy farms of New York below an hundred millions of dollars. Am I wrong then in supposing the dairy farmers of New York to be the most powerful body of agriculturists devoted to a specialty in that State?

It is remarkable how rapidly this interest has been developed. In 1840 the value of the dairy products of New York,—butter, cheese and milk,—was estimated by the United States census as only $10,496,000, and in all the States at about $34,000,000. In 1850 the product of butter in the United States and Territories was 313,345,306 pounds, and the cheese 105,535,893 pounds. In 1860 the butter product had reached 466,681,372 pounds, and the cheese 103,663,927 pounds. The value of these products that year could not have been less than two hundred millions of dollars. The total industrial product arising from agriculture within the United States, in 1860, was estimated at about eighteen hundred millions of dollars.

The products of the dairy, then, were one-ninth of the total agricultural products of the whole country.

The cotton crop of 1859 was 4,850,000 bales, worth $242,500,000—not very much more, it will be seen, than the value of the products from the dairy.

From the best information we can get, the cheese product of 1867, from the whole dairy district of the United States, amounted to 200,000,000 of pounds. Nearly half of this product was made in the State of New York.

Between 1840 and 1850 American cheese began to be shipped abroad, the first shipment having been inaugurated by Herkimer County dealers.

In 1848–9 the exports of American cheese to Great Britain were a little over 15,000,000 of pounds. Much of the cheese manufactured that year was poor in quality, and British shippers claimed to have sustained heavy losses. There was a more moderate demand the following year, and prices fell off a penny a pound, varying for fair to strictly prime from six cents to six and three quarter cents per pound.

The exports of 1849–50 were 12,000,000 pounds, and continued to vary without important increase for several years.

In 1860 the exports had reached 23,000,000 pounds, and were increased the following year to 40,000,000 pounds. About this time the associated dairy system began to attract attention. Several factories were in operation in Oneida County, N. Y., and were turning out a superior article of cheese. The system had first been inaugurated by Jesse Williams, a farmer living near Rome, in that county, and was suggested from mere accidental circumstances. Mr. Williams was an experienced and skilful cheese-maker, and at a time when the bulk of American cheese was poor. His dairy, therefore, enjoyed a high reputation, and was eagerly sought for by dealers. * * * * *

This system, during the last eight years, has been carried into the New England States and into the Canadas. It is largely adopted in Ohio, and has obtained a foothold in Wisconsin, Illinois, Iowa, Kansas, and other States. It is known abroad as the "American system of dairying," and its peculiarities are so well adapted to the genius of our people as to give it a distinctive character of nationality.

At the commencement of 1860 there were but seventeen factories in the State of New York. They were increased, during the next six years, to five hundred, and it has been estimated that there are now about eight hundred in the State.

Last year I, with many other New York dairymen, feared that the cheese interest was being overdone. Prices were quite unsatisfactory. The cost of cows ranged from seventy dollars to one hundred dollars. Labor was high, and we had to pay for flour from fifteen dollars to seventeen dollars per barrel. We had been accustomed to exchange at our doors forty pounds of cheese for a barrel of flour.

The speculators made a hue and cry that the country was full of cheese; that the whole West had suddenly sprung into the dairy business, and that they were prepared to ship immense quantities to the seaboard, flooding all the markets of the world —and so our dairymen yielded to low prices, and England was in ecstasies. When the year's operations were summed up we found there had been no over-production, and, instead of Western cheese coming East, considerable quantities of New York cheese had been shipped West.

THE EXPORTS.

We have given the exports of cheese in 1861 at 40,000,000 pounds; in 1862 the exports were, in round numbers, cheese 39,000,000 of pounds, and butter 29,000,000; in 1863, cheese 41,000,000, and butter 23,000,000; in 1864, cheese 46,000,000, and butter 14,000,000; in 1865, cheese 47,000,000, and butter 22,000,000; in 1866, cheese 45,000,000, and butter 5,000,000. For the past year, 1867, the exports of cheese were about 55,000,000 of pounds.

ENGLISH PRODUCTIONS AND IMPORTS FROM HOLLAND.

According to the estimate of the English shipper, Mr. Welsh, the product of cheese made in Great Britain the past year, 1867, has been 179,000,000 of pounds. We have no estimate of the quantity of cheese made in Holland.

In 1866 I was in Europe, and obtained for the American Dairymen's Association the quantity of Dutch cheese sent to England that year; it was 80,000,000 of pounds. An approximate estimate of the annual consumption of cheese in Great Britain may be gathered from the following figures:—

English home make, ...	179,000,000
Import from Holland, ...	80,000,000
From the United States, ...	50,000,000
Making total English consumption, per year, .	309,000,000

CHEESE CONSUMPTION, ETC.

I have said that fears had been entertained that we had reached the limit of over-production. Time must, of course, decide this question; but in the mean while a knowledge of the ordinary consumption of cheese in the United States and Great Britain may be a help on which to base future operations.

From careful estimates, it appears that the consumption of cheese in the United States and Canada is annually about 160,000,000 of pounds. This makes 469,000,000 of pounds as the consumptive demand in Great Britain and America. Against this we have—

Product of cheese made in Great Britain, .	179,000,000
of the United States, . . .	200,000,000
of Canada, ...	15,000,000
Total, ...	394,000,000

Quantity lacking to supply two nations beyond the home make, 75,000,000 of pounds.

DAIRYING AS A SPECIALTY.

But suppose we have resolved to enter upon this branch of farming; will it be best to make it the sole business of the farm to the exclusion of other branches? This question has been fully discussed and pretty effectually tested in practice through the old dairy districts of New York.

A few years ago the dairymen of Herkimer insisted that the dairy alone was more remunerative than other kinds of farming, and hence it was not worth while to devote attention to other branches. The area of pastures and meadows was spread to their utmost limit. They were ploughed only when necessity compelled, and then speedily turned to grass.

Even the breeding and raising of stock were neglected, and the herds largely made up by importing cattle from the non-dairying districts. So strongly did this single specialty system impress the mind, that butter manufacture was abandoned as far as it could be, and every effort was made to work up all the cream into the cheese. The best manufacturers in the country, the English shippers and the great army of cheese dealers insisted that fine cheese demanded the largest amount of cream, and that the richer the milk the better the cheese. I was the first to assail this principle and show it to be fallacious. I showed from actual experiment, from chemical analysis, from the whey-vats of factories covered with cream almost thick enough to bear a man, that fine cheese did not depend altogether upon the amount of butter in its composition.

So prejudiced are people who have been long engaged in a specialty, and educated up to a certain notion, that I doubt whether the dairymen of New York could have been induced to pay the least respect for such teaching, had not the acid process in cheese-making, which I had some years before introduced, proved a success, and become generally adopted, saving to the country millions of dollars.

Perhaps a word of explanation should be given in regard to this so-called acid process. Up to 1864 the cheese of America was manufactured by processes having no fixed principle. The thermometer for testing the heat in the various manipulations was only in occasional use. The impression universally prevailed that the milk, the curds and the whey, during the whole process of manipulation, should be kept perfectly sweet. Any perceptible acidity developed by accident during the process was regarded by cheese-makers as a calamity entailing losses. As a consequence, the great bulk of American cheese was soft, spongy, extremely liable to get out of flavor, quick of decay, and of no character in the English market except as poor, bad and indifferent. Immense losses were from time to time made by the dealers handling it; and although some prime dairies were made by those who had a life-long experience, they were not able to explain the principles by which their success was obtained. I had been experimenting in milk, with a view of fixing upon some definite stand-point as a guide in cheese-making. Instead of guessing at temperature by introducing the hand into the vat, the range of heat necessary for obtaining the best results was marked by the mercury. From this point the change in the process became a study, and the fact soon made itself apparent that cheese-making was purely a chemical process. That it was better to develop farther chemical change in the vats while the curds could be under immediate observation and control, than to trust the necessary changes and transformations to be perfected after they were put to press, or carried to the cheese-room. I found that by the use of acid (sharp sour whey,) in the milk, or by allowing the curds and whey to stand until acidity was developed to a certain point, the watery portions of the milk were more easily expelled and the curds assumed a more solid texture, while flavor, mellowness and flakiness could be more easily secured.

I think our dairy farmers made a mistake in their exclusive devotion to one single branch, and that a mixed agriculture, making the dairy the leading branch, would have given better results.

The English dairymen, in the great dairy districts in the west of England, devote but little land to meadows. They grow wheat, barley and other grains. They produce wool, mutton and beef. The herds in winter are fed upon chopped straw, with the addition of oil-cake, bran and coarse grains. Large profits are thus realized, and the land put in a high state of fertility.

Some of the Herkimer County farmers are beginning to adopt this system with success. Our soil is tenacious and difficult to be worked, but it yields large crops of wheat, barley, oats and corn. Some carry a few acres of hops, but this is not generally to be recommended, as hops are an uncertain crop, variable in price, and rob the farmer of the manures. Fruit culture, when it can be successfully conducted, is better. One of my neighbors in an adjoining town has 5,000 pear-trees just coming into bearing, and the profits from this source must be large, as the fruit sells readily at from five dollars to eight dollars per barrel.

Upon farms where grain can be raised with facility, the system of mixed husbandry in connection with the dairy, it would seem, must result in the most profit. Then, if you abandon the use of the " scrub native cow," and adopt the English system of selecting animals that will readily fatten and turn them as they do into beef before they become old and worn-out, your coarse grains, your bran and ship-stuffs, it seems to me, if fed up and converted into milk, beef and bacon, must bring more money than to ship them to market.

BREEDING STOCK FOR THE DAIRY.

A great many writers urge upon dairymen the breeding of a race of cattle for milk alone. Mr. Fish, of Herkimer, experimented in that way. He improved his herd so that it averaged a yield of between eight hundred and nine hundred pounds of cheese per cow; but the constitution of the animals became so impaired and weakened that it did not prove profitable.

Cows that yield five hundred to six hundred pounds of cheese, and then can be easily made ready for the butcher, are all that we should ask. Milch cows are liable to many accidents; some prove inferior for the dairy, lose a portion of the udder, fail in milk early, or run farrow. Such animals, if of a breed that will fatten rapidly, can be cheaply turned into beef, and if they have not proved profitable for the dairy, are made to pay a profit for the shambles.

I went to Europe in 1866, for the American Dairymen's Association, and examined the different methods of cheese-making in England. * * * * *

I found various processes in operation in the various shires or counties. In all these, excepting the Cheddar process, I was greatly disappointed. The Cheshire, the Wiltshire, the Double and Single Gloucester, and other methods, are defective and extremely laborious.

The implements are outlandish, and belong to a past age of the world. The dairy people in the different districts are tenacious of their practice, and adhere to it with a dogged pertinacity, nothwithstanding the Cheddar dairymen, under their improved system, are beating them in the markets from ten to thirty shillings sterling the hundred weight. Much of this cheese is manufactured by guess, and varies in character according to the skill and experience of the dairymaid. There is scarcely a thing in any of these processes (the Cheddar excepted) that would be of any service to us, and if introduced here would be a positive damage. American cheese is richer and better made, and is acknowledged by the best judges in Great Britain to surpass, in every respect, these styles as they are commonly made. The Cheddar, however, is a very high character of English cheese, and commands a very high price. Its good qualities have not been overrated. Their best samples have rarely been equalled, and never *surpassed*, in American dairies. The quantity made is comparatively small. It takes its name from a small village at the foot of the Mendip Hills, in Somerset County, its manufacture there having been commenced more than a hundred years ago.

Various improvements have been made in the process, until it has been reduced to a system which is at once simple and philosophical. It may be said to be a chemical process, requiring skill and judgment in the management of acids until the curd has passed through its different stages and is ready for the press. Its leading principles are similar to those now practised by our best cheese-makers, and it is due to them that the American cheese has been able to obtain such a firm foothold in the English market. The early expulsion of the whey in the English process, together with the exposure of the curd a longer time to the atmosphere, the pressing, grinding and salting, are doubtless improvements on our practice. I need not go into detail upon these points. They have been fully explained in my recent addresses before the American Dairymen's Association ; but I allude to them here that proper credit may be given to English dairymen. I must say this also in their favor : nothing while abroad struck me with greater force and admiration than the perfect neatness and cleanliness of the dairy. The milk-rooms are located beyond the reach of bad odors likely to taint the milk. They have stone floors, the joints nicely cemented together, so that no slops or putrid matter can find an entrance. The floors, the utensils, and everything connected with the establishment, are bright, clean and sweet as the table and crockery of the most fastidious housewife. Many of the farmers will not allow the milkers to come into the milk-rooms, but have conductors by which the milk is conveyed to the tub from the outside.

It is this perfect cleanliness of the dairy, together with the favorable condition of the climate and a more uniform temperature of curing-rooms, that enables them to secure that mild, pure flavor which is characteristic of some of their nicer grades of cheese.

The best American cheese has more butter in its composition, and it is better manufactured, as a whole, than the English. The great defect in much of our cheese is bad flavor. We have a hot climate to contend with. We are too careless in milking, and in handling the milk, where taints can be absorbed. We put the warm milk in cans, confining it with a close-fitting cover, and haul it a long distance in the blazing sun to the factory, and it is often in a putrid condition before going to the vats. What wonder, then, that much of our cheese, rich in butter, and splendidly manufactured, is out of flavor, and vast sums lost in consequence!

American dairymen have been trying for years to discover wherein this defect of flavor can be remedied. A great deal of time has been spent in the investigation of the subject, and a great many theories suggested, but it has all amounted to nothing. From my observations, both at home and abroad, I am convinced that first principles have been overlooked; that factories have been trying to make a finely-flavored cheese from imperfect milk, a condition which manufacturers never will and never have been able to accomplish.

A reformation must be had in securing clean and perfectly pure milk, together with better curing-rooms; and then, under our improved system, American cheese will stand where our nicer grades already do, as the richest and finest that are produced.

I went up to see the Royal Dairy at Windsor, and if every dairyman in America could go there he would come back with greatly improved views in regard to the importance of cleanliness in dairy practice.

RECENT IMPROVEMENTS IN FACTORY BUILDINGS, &C.

In the arrangement and fitting up of factories, some important improvements are now being introduced. Substitutes for steam-engine and boiler are being tested. One of the divices recently brought out, is an arrangement of gas-pipe set in a furnace, upon which the fire comes in direct contact, heating the water by this means. Another device just put in operation, is a nest of hollow cast-iron boxes, connecting by pipes and set in a brick furnace, the fire applied underneath. Mr. Sears, of Madison County, who owns two factories, has taken out his steam-engine and has tested this contrivance. He says they are the most perfect heaters that have yet been invented, and that he would not use an engine if furnished without cost. This new heater only costs $150 for a large factory ; it is simple, substantial, and gives perfect control of temperature. In a test at his factory, of the wood consumed, he finds that three-fourths of a cord of three-foot wood, will manufacture 12,000 pounds of cheese. The placing of the sinks below the vats, by which the whole mass of whey and curds may run out of the vats through a shute at one end, is another labor-saving appliance. There are machines for cooling the milk in the vats at night, and preventing the cream from rising, operated by clock-work, and by waste water from the vats. The application of wind for raising water to supply factories has been found to work satisfactorily.

Then there are two processes for extracting butter from whey, which are claimed to make good, marketable butter, adding largely to the receipts of the factory. The curd mill, though long in use in England, is now just beginning to be introduced in America, and with the best results. Its use is not only a saving of labor, but it improves the texture of cheese, rendering it more compact or less porous. In the Cheddar process, the curds are put in the hoops and pressed ten minutes, then taken out, ground in the curd mill, and then salted. This is, I think, an improvement upon our process, and should at once be adopted. By it you get a more uniform distribution of the salt, and know precisely what is being done, because the curd is uniformly drier, and the salt is not carried out in the whey, as in our process. It is claimed, too, that by salting before pressure, and while the curd is not sufficiently cool, the salt has the effect of forming a shining, tough pellicle about the particles of curd, not only enclosing whey or moisture, but on account of which the union is less perfect, and the cheese in consequence less compact. Again, the Cheddar dairymen, as soon as they can begin to distinguish an acid condition of the whey, immediately commence drawing it from the vat and allow the acid to further develop itself in the curd spread out, or heaped up in the vat or sink. This, I think, is another important improvement, which should be adopted at the factories. It is very difficult to regulate the final conditions of the curd, under all circumstances in the whey. The acid is often pushed forward upon the curd too rapidly, especially in hot and sultry weather. Then if there be taints in the milk, the longer the curd is steeped in the whey, the more distinct and marked will they be in the cheese ; but if you get rid of it early, there is more hope of preserving clear flavor, since every moment the whey stands under the influence of heat and decomposition, the stronger becomes its odor and taint as every practical cheese-maker has observed. It is to be doubted whether an uniform fine flavor can be maintained under all the variable conditions of milk, unless this principle is recognized. At any rate under this process, there is less difficulty in obtaining desirable results.

There is another suggestion in regard to rennet and annotto which is not understood, even by our oldest and best cheese-makers. At many of the factories great complaints are made that the rennets are weak, and extraordinary large quantities are used at heavy expense. It is true there is great difference in the strength of rennets, and the quantities of milk they will coagulate, but the trouble is often aggravated by not properly understanding the strength of the materials employed. The annotto commonly used is cut by potash, a powerful alkali. Rennet is an acid, or at least its action is similar, and is directly opposite to that of an alkali. The one neutralizes the other. Now, if annotto is cut with very strong lye, or a strong solution of potash when it is added to the milk, it neutralizes or destroys the effect of a large quantity of rennet. Hence the annotto should always be cut with as weak a solution of potash or lye as is possible to dissolve it.

UTILIZING WHEY.

The utilizing of whey from factories has received considerable attention, and various suggestions have been made as to its value and most profitable employment. Its analysis shows that it is too valuable to be thrown away. Some contend that it can be turned to the most profit when fed to cows, while others stoutly affirm that more can be realized from it as food for hogs.

While in England I was told by the dairy farmers, (and it was confirmed by the provision dealers in London,) that a very superior quality of pork was made by feeding whey mingled with barley meal; that, in fact, no bacon was equal to it in delicacy of flavor, and that it sold for most money in the market.

Of the solid constituents of whey, the sugar of milk is in the largest proportion, being very much in the same ratio that it is in the milk. Some effort, it would seem, ought to be made with a view of extracting this material for commerce. The milk sugar that we find at the shops is imported from Switzerland, and is retailed at one dollar per pound. An estimate has been made of the annual yield of sugar from thirty factories, averaging 400 cows each, and it amounts to the enormous quantity of two millions of pounds, or 10,000 barrels; but, suppose the price is only ten cents per pound, then a factory of a thousand cows, on the above estimate, would yield 800 pounds of sugar per day, which would amount to $80, or $2,400 per month.

When in London, I had some conversation with Prof. Voelcker, the great chemist of the Royal Agricultural Society, on this subject, and he was surprised that no effort had been made by the American factories to turn this constituent of the whey to account, since the large quantities of milk received at one point made it more feasible than where the milk was scattered over the country and worked up in family dairies. Good milk contains from 8 to 9 per cent. of butter and caseine, and 5 per cent. of milk sugar. The analysis of whey shows that it yields 4¼ per cent. of milk sugar, or half as much weight as the butter and caseine of the milk combined.

In Switzerland, milk sugar is made by allowing the whey to trickle down the sides of the mountains in wooden gutters or troughs. Treads are placed in the gutters, upon which the sugar adheres, as the watery portions pass off in evaporation.

It must be evident that the source of income from the dairy would be very much increased could some practical and inexpensive method be invented to take this article from the whey. Whether evaporating pans could be constructed, and heat used profitably in securing this object is a question for investigation; and it seems to me that agricultural societies might profitably employ some chemist to make the proper experiments.

SOME OF THE PRINCIPLES TO BE OBSERVED IN CHEESE-MAKING.

In summing up the question of cheese manufacture, I have only time to notice some of the leading principles that are essential to success. And the first is good clean milk from healthy cows, well fed and well cared for. 2d. Studying the condition of the milk, and understanding that condition before operations commence. 3d. Setting the milk to coagulate at a temperature from 72° to 82°. 4th. Drawing the whey early at the commencement of any perceptible acidity. 5th. Exposing the curd to the atmosphere, and allowing it to fully perfect its acidity after the whey is drawn. 6th. Putting to press before salting, at a temperature of 50° to 65°. 7th. Grinding in a curd mill and then salting.

BUTTER-MAKING.

I fear I have detained you too long, but my address would seem incomplete without a brief reference to butter-making. It has always seemed extraordinary to me that there are so few good butter-makers in the country, when the article enters into such large and universal consumption, and when there is such a great desire on the part of consumers to obtain that which is good.

Butter-making is not so difficult as cheese-making. Any one can make good butter that is neat and cleanly, by understanding and practising a few principles. The greatest mystery about it is, to know how to set the milk and get up the cream properly. Cream that rises in uneven temperatures, in bad atmospheres, where it can absorb the gases from decaying vegetables, or the many intolerable stenches often in the neighborhood of the milk-room, cannot be expected to make good butter, though *churned and packed by an angel.* We make a good deal of poor butter in New York; it is sold under the name of grease. I suppose there may be occasionally a *little* poor butter made in Massachusetts. I have tasted a vast deal of it wherever I have travelled—at hotels and upon tables of all classes of people. Good butter is a luxury; poor butter an unmitigated nuisance.

BUTTER FACTORIES.

In the butter factories the milk-room is constructed so that good ventilation is secured. It is provided with tanks for holding water. These should be sunk in the earth in order to secure a more uniform temperature of water, as well as for convenience in handling the milk. The vats should be about six feet wide and from twelve to twenty feet long, arranged for a depth of eighteen inches of water. There should be a constant flow of water in and out of the vats, so as to secure a uniform temperature of the milk, after it has been divested of its animal heat. The milk is set in tin pails, eight inches in diameter, by twenty inches long, each holding about fifteen quarts of milk. As fast as the milk is delivered, the pails are filled to the depth of seventeen inches and plunged in the water, care being taken that the water comes up even with, or a little above, the milk in the pails. The temperature of the water should be 48 degrees to 56 degrees. A vat holding 2,000 quarts of milk should have a sufficient flow of water to divest the milk of its animal heat in less than an hour. Milk that is cooled in this way throws up its cream rapidly, and the even, uniform temperature in rising the cream, operates favorably when it goes to the churn, the butter coming solid and of good color. Good, pure milk, when put in the vat in this way, will keep sweet for thirty-six hours, even in the hottest weather. The cream should be taken off before the milk sours, and it will nearly all come up in twenty-four hours. The old notion that cream cannot rise through a depth of milk greater than seven inches is an egregious error. The Orange County dairymen get as much cream when milk is set in this way as in shallow pans.

The Orange County butter-makers have tried a great many patent churns, and they find none they like so well as the old-fashioned barrel dash churn. They use the barrel and half-size dasher, and in churning put in about fifty quarts of cream. This is diluted with water, by adding cold water in summer and warm in winter, at the rate of sixteen to thirty quarts each churning.

The temperature of the cream in summer when the churns are started is about sixty degrees, and in cold weather about sixty-eight degrees. It requires, and it is preferred, that from forty-five to sixty minutes be employed in churning, when the butter should come solid and of a rich yellow color. It is then taken from the churn and thoroughly washed in cold spring water, and salted at the rate of eighteen ounces of salt and twenty-two pounds of butter, and for winter-kept butter a little more salt. After having been salted and worked over it is allowed to stand till evening, when it is worked a second time and packed. Great care is taken with the packages; they are of oak, strongly hooped, and perfectly tight, so as not to allow the least leakage. After being filled with butter they are headed and strong brine poured in at the top to fill all the intervening spaces.

The essentials for a prime quality of butter may be very briefly summed up, and are as follows: Securing rich, clean, healthy milk—milk obtained, if possible, on rich old pastures, free from weeds. Setting the milk in an untainted, well-ventilated atmosphere, and keeping it an even temperature while the cream is rising; proper management in churning; washing out or otherwise thoroughly expelling the buttermilk, and working so as not to injure the grain of the butter; thorough and even incorporation of prime salt, and packing in oaken tubs, tight, clean and well made.

Dr. Hartwell. I wish to inquire what percentage of butter there is in milk?

Mr. Willard. Three to four per cent.

Prof. Gamgee. The interesting address to which we have listened demonstrates many things; but the one which strikes me particularly is, that in cheese-making, as in every branch of agriculture, you must follow the rule that is followed at the present time in the art of medicine: you must train specialists. Omniscience, so far as man is concerned, belongs to the days of yore. One man cannot know all things; indeed he can only know *one* well; and we must not forget the trite old saying, that each individual should learn one business and stick to it; and the more careful he is to do that, the better will he succeed, and the greater benefits will he confer upon humanity.

If I am not very much mistaken, the great success of your cheese-factories in America arises from the fact which we have heard so well explained to-day, that the person best acquainted with the management of milk, and with the preparation of cheese, collects from all sources the milk that he can transform into cheese, instead of allowing the dairymen to go through the processes of feeding and milking and collecting, in a hap-hazard way, the milk in dirty cans, and so on, and then trying to make cheese out of that material. You have got special cheese-makers.

But, next to this demonstration that specialists in the art of cheese-making are evidently one of the necessities of the age, I cannot sit down without remarking that Mr. Willard's observations show how many applications there are of those truths to which I alluded yesterday in regard to the propagation and development of putrefactive germs. Putrefactive germs are bitter. If you have a dirty milk-pail, you may have only one germ in it, but that germ very soon becomes millions, and you have millions of bitter particles from one little dirty spot, which scalding water very readily removes. Here you see the boiling kills the germs, just as in Prof. Wyman's method boiling kills the germs in the cans in which your meats are packed.

Now, the preservation of cheese is one of the most important points. We must have none of these germs in it. It has been found very difficult to transport even well-made cheese to tropical climates. You have in the East Indies one of the finest markets in the world. You can get two shillings and sixpence in gold for every pound of cheese delivered in Calcutta; and in England they resort to the plan of packing cheese in hermetically-sealed cans, and exhaust the air, and then take them to tropical climates. A portion may get there in a tolerably passable condition, but the great majority get there bad. And why? In the first place, because these germs have not been destroyed; and, in the second place, because sufficient attention has not been paid to rendering the materials that constitute the cheese little liable to putrescence.

Here I must refer to a Yankee—one of the noblest specimens of the Yankee I have met in America. Probably his name is known to most of you, and it should be known throughout the length and breadth of the country, for he is a public benefactor. I mean Gale Borden. He is one of those shrewd, industrious men, who work out problems by dint of great perseverance, and never cease to search for truth. But what has he done? He has lately been working at this very subject of cheese-making. I am sorry that I was not aware that this question would be brought up, for I would have prepared myself with more accurate details with regard to his process. There are two points to which he specially attends. The first is, to make the cheese so as to have within its substance the least amount of putrescible material. In addition to the caseine and sugar of milk, you have a considerable quantity of water, charged with a certain amount of albumen. That albumen is not acted on by the rennet. The rennet turns the caseine into cheese, and so you ought to have as little as can be, besides the pure caseine and the constituents of the rennet, with the flavoring principles. The putrefactive matters that exist, which are albuminous and nitrogenous, must be got rid of. The chemists, I believe, consider nitrogenous matters as tending to favor decomposition. There may be some fallacy in that; but certain it is that those matters, dissolved in the water remaining in the cheese, constitute the best soil on which germs of decay can operate, just as they do in the case of meats. Gale Borden subjects the materials to the action of centrifugal force, and secures a perfect expulsion of those matters, leaving behind a purified curd, of most admirable composition, that will resist almost any influence. You have in that the process of desiccation, which I said yesterday is one of the most valuable methods of rendering meats and other substances incapable of undergoing decay.

There is another point in Gale Borden's process which is of the greatest interest. Mr. Willard remarked that dairymen were not always satisfied with the results they obtain from the use of definite quantities of rennet, and he said that this arose, to a certain extent, from the alkali that is used to "cut" the rennet. But it is easy to prove that the rennet, which is the stomach of the calf, is used for the purpose of producing in a mass of milk precisely the result that occurs in the calf's stomach. Well, you can understand that if a calf is killed just after he has digested an enormous bulk of milk, when he is not hungry, (and we well know that the sensation of hunger is produced by the repletion of the gastric glands with the acid gastric juice which is being prepared for the process of digestion,) this fact has a great deal to do with the strength of the rennet. It is impossible for the cheese-maker to know anything of the conditions that may affect the digestive capacity of the stomach of the calf at any special time of day when he may be slaughtered. What has Gale Borden done? In his usual way, he has studied this question thoroughly, and he says: "Let us have an average rennet. Let us take the stomachs of a hundred thousand calves and subject them to a process of gradual desiccation, and purify them in a current of clean water, without soaking them, so as to soak out the strength of the rennet, and get a clean article, instead of the dirty, ill-prepared rennet we too often see." I am not, of course, making any remarks here in regard to what gentlemen present are doing. They may be very careful; and if they are careful, and adopt the process that Gale Borden recommends, they can secure a uniform rennet. But I have seen a good many rennets, in this country as well as in England, and I know that in the majority of instances the rennet is very improperly prepared.

Well, Gale Borden collects his rennets, (the more he can get the more uniform the result,) and then dries them at a low temperature, (I believe he does it *in vacuo*,) and he desiccates them, so that not a particle of putrescible matter remains. After he has dried these rennets, he chops them fine, powders them, mixes them all up, and he has a uniform rennet. You have nothing to do but to take a spoonful of this rennet, or a given quantity, and you know that you have a standard rennet, which is, I believe, one of the great means of insuring to cheese-makers success in their operations.

I only wish that I knew more about Gale Borden's discoveries in this particular, but it will suffice for me to direct your attention to the labors of a man as distinguished as he is in the practical applications of science—a man who, you know, has introduced a system of condensing milk for large cities, which I can myself declare to be a very great improvement. When I remember the condition of the supplies in our own cities in England, and the great difficulty there is in securing for children anything that is decent to take, I can see that Gale Borden's invention with regard to the condensation of milk should be known through the whole length and breadth of the world. While on this subject of cheese-making, if I just draw your attention to the work he is doing, I am sure I am doing a good service.

Before sitting down, I wish to allude to Dr. Potter's method of bringing milk down to any desired temperature properly and rapidly. Dr. Potter has a tin conical vessel, grooved on the inside, within which there is another tin conical vessel, with tubes fitting these grooves. The tubes are extremely small, and run spirally round the vessel. You can have the water in the inner vessel at whatever temperature you choose, and pass your milk straight through the inner vessel into the other. A very small vessel will take as much as ten men can draw from the cows. It trickles through these spiral tubes and comes out at the lower end at the temperature you desire, instantly. It is a matter of five minutes, more or less, depending upon the rapidity of the flow and the quantity of milk. I am sure that system of cooling is the best yet devised.

You probably will not be astonished if, before I sit down, I advise you to go a step further than Mr. Willard has advised you to go. He says, if you have any diseased cows, do not mix the milk of those animals with the milk out of which you are going to make your cheese and butter, but throw it to the pigs. Now, I say, don't throw it to the pigs! I think the force of that remark will be appreciated without further observation by myself.

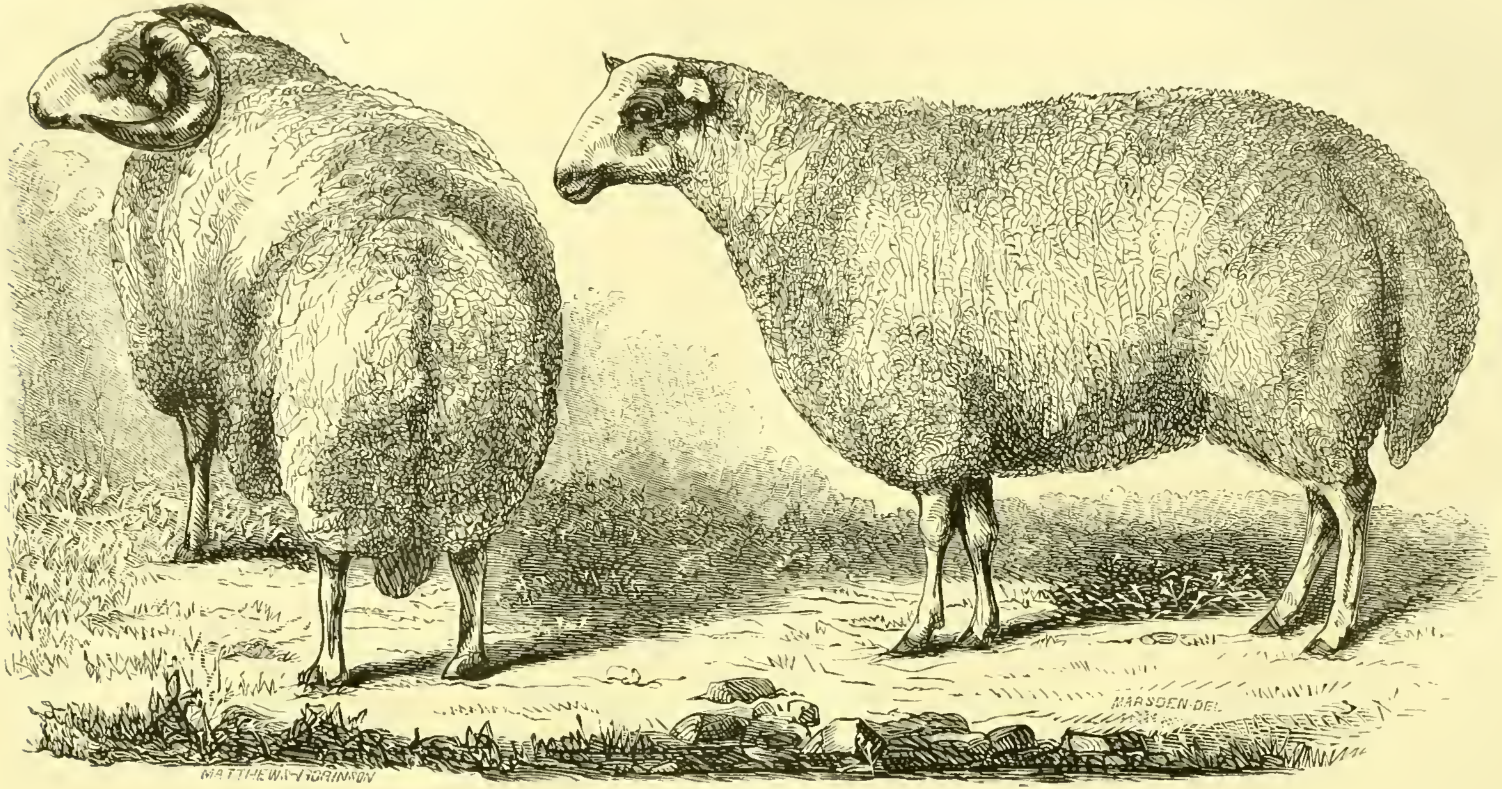
Adjourned to 2 o'clock, P. M.

AFTERNOON SESSION.

The Board met at 2 o'clock, and the Chairman stated the subject for consideration to be the Hay Crop of Massachusetts. The discussion was opened by Mr. Alex. Hyde, of Lee.

THE HAY CROP.

Grass is king among the crops of the earth. More land is devoted to its cultivation and more money value realized from it than from any other product, cotton not excepted. Our Southern brethren, a few years since, crowned cotton as king; but events showed him to be an usurper of a throne which rightfully belongs to grass. Mankind for ages lived without cotton, but never existed without grass. Paradise would not have been paradise had not its fields been covered with a carpet of green grass. Certainly the animals that came to Adam for their names would have found miserable forage and run a short career, had not the verdant herbage of the pastures furnished them sustenance. The statistics of the nations of the earth prove that grass is the most essential and most remunerative of


MATTHEWS-ROBINSON
MARSDEN DEL.

CARAMAN OR FAT-TAILED SHEEP.—OWNED BY W. W. CHENERY, OF BELMONT.
See Preface to Abstract.

all crops. This is true, taking the world at large, and is particularly true in New England, as, by the character of our climate, we are compelled to stall-feed our cattle nearly half the year. By the official returns of the products of Massachusetts for 1865, we learn that the value of the hay crop for that year was $13,195,274; while corn, including broom-corn, was less than three millions, potatoes about two and a half millions, oats a little over half a million, and rye about a third of a million. If we add to the hay the value of the grass consumed in the pastures, it will be found that the grass grown in Massachusetts exceeds in value all the other agricultural products combined. We thus see that grass is one of the most important subjects that can occupy the attention of farmers. The annual value of the grass crop in our whole country, including pasturage and hay, cannot be less than $500,000,000. According to our last State census, we have in Massachusetts 90,282 horses, about 50,000 oxen and steers and 174,386 cows and heifers; and all these animals, which minister to our necessities and comforts, are mainly sustained by the grasses. So thoroughly convinced are our most sagacious farmers of the importance of this crop, that with most it occupies the chief position in the rotation; and indeed all other crops are cultivated with reference to an increase of this leading staple.

Grass is an indigenous product of our soil. Other useful crops must be sown, but grass springs up spontaneously. As soon as the forests are cleared and the sunlight is let in upon the ground, grass makes its appearance, clothing nature with a verdure most pleasing to the eye, and at the same time furnishing the most nutritious forage for the cattle that roam over our thousand hills. A struggle does indeed immediately commence between the useful grasses and the worthless thorns and brambles, much like the struggle between good and evil in the moral world; but it is encouraging to know that the good, useful and beautiful are sure to triumph when cultivation lends its helping hand. As a father, by proper vigilance and culture, can train up his family in the ways of righteousness, so the farmer, by constant cultivation, can be sure that the grasses will root out all noxious weeds. Every careful observer must have noticed that where cattle leave their droppings in the fields thorns do not spring up, but in lieu thereof a rich mat of grass. As it is easy and natural for man to speak the truth, so it is natural for the fields to produce grass ; the thistles and weeds come only by neglect. If any one wishes to know how to eradicate daisies and John's-wort from his meadows, we say to him emphatically top-dress them richly with good compost, and if the grasses do not get the start and choke out the vile interlopers, then our experience and observation have not been extensive enough to form a general principle. We have seen fields, and must confess to having owned them, so white with daisies that a passenger on the cars supposed they were luxuriant with an early crop of buckwheat; and these same meadows, by the simple process of top-dressing, have exchanged their pale-faced look for one of deepest green. Whether nature spontaneously produces good or evil, grass or weeds, we leave for the metaphysicians and theorists to speculate upon ; but this much we know practically: that if land is well cultivated, where weeds abounded grass does much more abound.

It is not a little singular to notice in this connection that the sowing of grass seed is a very modern practice, and America has the honor of discovering that the natural grasses may be improved and the crop of hay greatly increased by carefully collecting and sowing the seeds. When our fathers left England in 1620, red clover was unknown there, as a distinct crop ; and it was more than a century after this that the English began sowing the chaff and seed collected from their barn floors and around their haystacks. In 1769 the London Society for the Encouragement of Arts offered premiums for the collection of seeds of the wild grasses and experiments in the culture and comparative value of the natural herbage of the island. The mildness of the English climate allowed the farmers of that country to rely upon the native products of the soil for the sustenance of their stock ; but the rigors of our New England winters soon compelled our fathers to resort to more artificial resources for forage. Indeed, we read in the early history of Plymouth and Massachusetts colonies, of whole herds of cattle dying from starvation and exposure, ere our fathers had learned the necessity of barns and the value of good hay. The Puritans were very pure and noble; but if we should treat our cattle as stock was treated in the first century of our colonial history, Mr. Burgh would expose us in the "New York Tribune" and bring us to justice for cruelty to animals. We wot that the Puritans did it in ignorance and in imitation of their English fathers. Clover was introduced into England about the year 1633, but the cultivation of Timothy and orchard grass the English learned from us more than a century afterwards; and it was not till the Duke of Bedford made his experiments, early in the present century, that the grass crop assumed the importance it now commands; and we do not think it has yet generally attained the relative position and attention it deserves among the products of the earth. It is like the air we breathe, —so common and so cheap, that we undervalue it. We avoid treading upon the blades of corn, but walk upon the velvety turf without compunction; but the grass "crushed to the earth rises again," and is bound, like truth, to prevail over all its foes.

Chemical analysis and careful experiment agree in assigning a higher nutritive value to well-made hay, in comparison with grain and roots, than is commonly supposed. The general impression is, that grass-fed beef must necessarily be poor, and that cattle fed on hay alone during the winter improve but little in size and deteriorate in flesh. That grass-fed beef is often poor, and that our herds make little growth during the winter and are generally "spring poor" in April, we cannot deny. But the lean, blue beef must not be charged to the account of the grass, nor the skin-and-bone appearance of the stock to the account of the hay. Let the cattle graze in pastures luxuriant with white clover, redtop, June and orchard grass, and the beef will be fit to set before an English king or a New York alderman. The trouble with grass-fed beef is that the pastures are either starved or overstocked; and if the lean kine that go bellowing about in the spring, or stand shivering and shrivelled under the lee of some fence, could speak English, they would say with Oliver Twist, "We want some more."

We have seen cattle luxuriating in rich pastures whose flanks and surloins fairly rolled with fat; and we have no doubt that beef thus made is more healthy than where the animal is confined in a dark stall, condemned to breathe impure air, fed with oil-cake, and deprived of all exercise. We have also seen herds of cattle wintered on hay, that continued growing during the winter, and looked as sleek and thrifty in the spring as when housed in the fall. There is no necessity, therefore, for poor grass-fed beef, nor poor hay-fed stock. If any reliance can be placed on Boussingault's table of nutritive equivalents, 100 pounds of good English hay are equal, in feeding qualities, to 65 pounds of barley, 60 pounds of oats, 58 pounds of rye, 55 pounds of wheat, 70 pounds of corn, 382 pounds of carrots, 319 pounds of potatoes, or 676 pounds of Swedish turnips. Other chemists make these equivalents a little different, but all make the relative value of hay higher than most Yankees would guess or most farmers would calculate, without making accurate experiments. We must, however, remember that the hay with which these grains and roots are compared is good English hay, not the rough scurf of our meadows, composed of daisies, thistles, and other weeds, with a few spires of grass thrown in for seasoning, and the whole allowed to stand on the sod till most of the nutriment has gone to the formation of seed, that has been scattered by the birds and winds to the four corners of the earth. It is because much of the hay which we feed to our stock is of so poor a quality that we estimate its nutritive value at so low a rate. Practical farmers who have carefully experimented in feeding good hay, grain and roots, do not differ materially in their conclusions from the analyses of scientific chemists. Thaer, from his experiments, estimates 100 pounds of hay as equivalent to 76 pounds barley, 86 pounds oats, 71 pounds rye, 300 pounds carrots, or 460 pounds mangold wurzel. The grains, it will be noticed, rank lower in the practical experiment than in the chemical analysis. From both experiment and analysis we conclude that a hundred pounds of hay is equivalent in nutrition to one bushel of corn or barley, two bushels of oats, four bushels of potatoes, or five bushels of carrots. As there can be no question but that we can raise a hundred pounds of hay at less expense than a bushel of corn or five bushels of carrots, it follows that hay should be the leading crop, where crops are raised to be fed out to stock.

We know that in comparing substances so unlike as hay and roots there is some uncertainty, especially in the analytical comparison. It is too much like comparing chalk and cheese. There may be some homœopathic dose of medicine in the carrots so minute as to escape the chemist's test. We would, therefore, by no means condemn the roots. We raise them, and have faith in them. It is not because we like corn and roots less that we thus speak, but because we like hay more. We should be sorry to confine our cattle to dry hay alone for the six long months of our winter; but if we cannot have both hay and roots, we speak for the hay. It is for the animal what bread is for man, the staff of his life.

How, then, can we increase the quantity and quality of our hay crop? We reply, in the first place, by sowing a greater quantity and variety of seed. Our ancestors sowed no grass seed at all, relying for a crop of hay solely upon the spontaneous production of the soil. A step in advance of this was the practice of sowing the refuse seed scattered on the barn floor and around the haystack. Another step was sowing a small quantity of two or three varieties of clean, selected seed; and we have another long step to take, and sow liberally of half a dozen, or even a dozen of the hundreds of the different grasses that we find growing naturally in our fields. "He that soweth sparingly shall reap also sparingly, and he that soweth bountifully shall reap also bountifully," is emphatically true in the hay crop. We remember the time when the custom was to sow twelve quarts of grass seed to the acre—generally eight quarts of Timothy and four of clover. This gives about fourteen million seeds, or three hundred to the square foot, and this would be a sufficiency if we could be assured of an equal distribution and certain germination; but this is impossible. Besides the difficulty of an even distribution, many of the seeds are spurious, some are devoured by birds and insects, and more still are lost by having too much or too little depth of earth—generally the former. Most of our grass seeds germinate most surely when only covered one-fourth of an inch, and by actual experiment it has been ascertained that when covered an inch half the seeds fail.

We can learn something of the necessity of abundant seed-sowing by observing how bountifully nature provides seed, so as to guard against all contingencies, and to insure the reproduction of the plant, which seems to be the great aim of all vegetation. A bushel of Timothy will average over fifty million seeds; an acre of corn will produce seed enough to re-stock two hundred acres. Let us imitate nature and sow more bountifully that we may also reap more bountifully. It may be possible to overstock land with grass seed; but we have never known such an instance, and we are confident that a hundred fields are damaged for the want of seed where one suffers by being overstocked. There has been great improvement in the amount of seed sown within the past few years, and some of our best farmers now sow a bushel of redtop, half a bushel of Timothy, and one-eighth of a bushel of clover. This is progress in the right direction. But is this a sufficient variety of seed? The addition of redtop is a great improvement. Though it does not show itself much the first year, among its more precocious and aspiring neighbors, Timothy and clover, still it fills the lower and vacant places, and as the clover dies out raises its modest and beautiful crest and furnishes a hay of the first quality, especially for neat stock; and it has the great advantage over Timothy of not suffering so much from not being cut just as it comes to maturity. The long stem of Timothy, as soon as it has served its purpose of conveying nutriment for the production of seed, becomes dry, hard, woody fibre, about as indigestible as an old chestnut-rail; but redtop thickens up from the bottom, and remains succulent for a long time. There are, however, many other grasses worthy of cultivation besides Timothy and redtop. And here also we should learn a lesson from the variety which naturally grows in our rich and permanent meadows and pastures. An examination of an old rich pasture will disclose ten or a dozen, and sometimes even twenty, distinct species of grass growing side by side. These different varieties draw on the soil for different elements of nutrition, so that the exhaustion of any one element is not so great as might be supposed. Mother Earth is much like a mother hen that scratches no harder for a dozen chickens than she does for one. We should consider it miserable economy to bring up one, two or three chickens under one hen, and it is almost as bad economy to sow only two or three kinds of grass seed. In most of our newly-stocked ground many vacant spaces occur, and though they may seem small, still in the aggregate they amount to a large quantity, and very sensibly diminish the harvest. The grass which does grow may have a more rank growth from luxuriating in so much space, but does not furnish so tender and delicate hay as when it grows more compactly. We have seen fields of Timothy that at a little distance looked as though they might yield a great crop of hay, but when we examined them more closely we found the stems too far apart.

Nature abhors a vacuum, and, if the meadow is rich and remains for a series of years in grass, fills up these vacant spaces with other varieties. But would it not be better for us to take time by the forelock, and sow a greater variety of seed, and not waste years in waiting for nature to make up for our deficiency? In her abhorrence of vacuums she may put in such kinds of grass or weeds as we do not like, and it is always better to forestall and guide her in the operation. Where she gets her seeds to fill up the vacant spaces is a mystery. Some of them may have lain dormant in the earth, only waiting for favorable circumstances under which to germinate; others may be brought by the winds and the fowls of the air, or be disseminated in the top-dressing. We were surprised, a few years since, by seeing our fields covered with the meadow fescue, of which we had never sown a seed, and did not even know the grass. It still lingers in our meadows; but whence it came is as much a mystery as the change of the wind. We found it an excellent early grass, and should not object to it as a standard variety to be sown regularly.

When land is stocked down for grazing, a variety of grasses which will ripen in succession is desirable, and we have varieties that are maturing in succession for six months of the year. In April the spear-grass blossoms, in May we have the meadow fox-tail, the sweet-scented vernal, and white clover. The number of grasses that blossom in June is legion. This is the carnival, or rather the graminivorous, season for grazing stock, more grasses coming to perfection during this month than at any other season. We can only mention the most important—Timothy, the various fescues, orchard grass, June grass, rye-grass, and red clover, which we class among the grasses, though strictly it is a leguminous plant. In July come red-top, foul-meadow, and English-bent. In August we have floating fox-tail, blue-grass and creeping-meadow; and in September the hairy-panic, red grass and poverty grass, with many of the above-mentioned which continue in blossom from month to month. It is worthy of observation that almost every grass will continue growing if mowed or cropped before it goes to seed. As the production of seed is the great end aimed at in nature, no plant seems contented till it has accomplished this end, but lives and struggles against all obstacles till it has fulfilled this mission. When it has accomplished the purpose of its existence, in producing seed after its kind, it is ready to die; therefore our pastures should be so closely grazed that none of the grasses will run to seed, and they will remain green and luxuriant throughout the season.

In stocking lands designed for mowing fields, it is desirable, though not essential, to sow those grasses which will mature about the same time. June, or Kentucky blue-grass, as it is termed at the South and West, meadow fescue, red clover and orchard grass require early cutting in order to secure them in their best state for forage. Timothy, the standard grass of New England, comes a little later, and redtop, next to Timothy the great favorite, later still.

We desire to speak a word in favor of the much-neglected orchard grass, which we have found one of the most luxuriant and nutritious both for grazing and for hay. It never says die. It is the first to furnish a bite for the cattle in spring, is little affected by the droughts of July and August, and continues growing till the severe cold of November locks up the sources of its nourishment. When cut or grazed it starts up with the vigor of the fabled Hydra. During the past summer we mowed a luxuriant crop of this grass in June, and another was ready for the machine by the first of August. In a few days it was fit for grazing, and, as we did not wish to mow it a third time, we let in the cattle of an adjacent pasture to graze upon it, leaving the passage between the two fields open. The feed in the pasture was good, but the cattle were seldom seen to return to it, evidently preferring the luxuriant and succulent orchard grass. We advise no man to sow it on his lawn, for it would need cutting every morning before breakfast. We have grown it in one field for eight years and see no diminution of the yield, though cutting two crops regularly each year. If cut while in blossom, both cattle and horses are exceedingly fond of the hay, and do well upon it. If left to stand till the seeds are matured, it becomes more tough and wiry than even Timothy, and cattle will need to have their teeth sharpened to eat it in this stage of its growth. Our good opinion of this grass is strengthened by that of the late Judge Buel, one of the most discerning of agricultural observers, who says: "The American cock's-foot or orchard grass is one of the most abiding grasses we have. It is probably better adapted than any other grass to sow with clover and other seeds for permanent pasture or for hay, as it is fit to cut with clover and grows remarkably quick when cropped by cattle. Its good properties consist in its early and rapid growth and in its resistance of drought. Sheep will pass over every other grass to feed upon it. I prefer it to almost every other grass." Mr. Sanders, of Kentucky, says: "My observation and experience have induced me to rely mainly on orchard grass and red clover. Indeed, I sow no other sort of grass seed. These grasses mixed make the best hay of all the grasses for this climate. It is nutritious and well adapted as food for stock. Orchard grass is ready for grazing in the spring ten or twelve days sooner than any other. When grazed down and the stock are turned off, it will be ready for re-grazing in less than half the time required for Kentucky blue-grass. In summer it will grow more in a day than blue-grass will in a week." This is the testimony of a man from the grass-growing State of Kentucky, where we have generally supposed that blue-grass was the king of grasses. We might cite the testimony of Judge Peters, of Pennsylvania, and other eminent agriculturists, in favor of orchard grass; but we have said enough to call the attention of farmers to it, and if its general cultivation can be introduced into Massachusetts we shall feel that we have done the State some service. We will add that we do not favor sowing orchard grass alone. It is much inclined to grow in tussocks, and thus leave much vacant space in the soil. This may be remedied in a measure by thorough pulverization of the soil, and by a liberal allowance of seed—at least two bushels to the acre; still, we should prefer to sow clover, meadow fescue, Timothy and redtop with it, so that the surface of the ground may be filled with roots and all the virtues of the soil be brought into requisition. We have found, too, that orchard grass loves a deep, rich, moist soil, and are confident that in such a soil no other grass yields such an abundant harvest. Why it is so much neglected among us we cannot divine, unless it is the fashion of sowing Timothy and clover; and fashion is as much a tyrant among farmers as among the ladies, though showing his power in a different mode.

As a second suggestion for the improvement of our hay crop, we mention early cutting. As to the time of cutting grass farmers disagree. Some recommend cutting when the grass is in bloom, others when the blossoms have just fallen, others when the seed is in its milky state, and others still when the seeds are ripe. The advocates of the last-mentioned time are few and growing beautifully less. As attention has been paid to the time of cutting grass, and the observation of farmers has been turned in this direction, a great change has occurred in the opinion and practice on this point, and the grass of Massachusetts is probably cut a fortnight earlier now than it was ten years since. Towards this result the mowing machine has greatly contributed, as it enables us to finish the hay harvest with great dispatch. Still, the practice of many farmers is to be dilatory in their haying, and the consequence is that they lose much of the virtue of their hay. In 1856 the able and efficient Secretary of the Massachusetts Board of Agriculture addressed a series of inquiries on the hay crop to one or more farmers in each town in the State, and this question was asked among others: "At what stage of growth do you prefer to cut grass to make into hay?" Answers were received from more than two hundred towns, and those from a hundred and fifty towns, about three-fourths of the whole, a majority sufficient to overcome any veto, were in favor of cutting Timothy and red-top when in full bloom, and red clover when about half the heads are in blossom. This, we think, is the true theory; but we fear the practice, though greatly improved of late years, is not up to the theory. Grass passes so rapidly from the blossoming stage to that of mature seed, that before we are aware the virtues of the plant are concentrated in the seed, and the stalks and leaves become dry, hard and indigestible woody fibre. Some argue that cattle love this dry fodder, and that there is more nourishment in it than in its green, succulent state. If so, why do not the instincts of cattle lead them to eat it when roving in the pastures and acting their option as to what they they will eat. All must have observed that when in any locality in a pasture the grass has gone to seed, cattle avoid it, and nothing but starvation will induce them to eat such grass. The instincts of cattle are a pretty sure guide—certainly as likely to be correct as the abstract reasonings of the minority of men.

The true principle in haying we think is to secure the hay at a time when we can harvest the largest amount that shall be like grass in its perfect state; and this we can do when the grass has attained its growth, and before the starch, sugar and gluten of the plant have gone to the formation of seed or been converted into woody fibre. The starch and other nutritious compounds are on the increase so long as the plant grows; but with blossoming, growth ceases, and now is the time, with the least labor, to secure the greatest amount of forage in its best condition. Our mothers, when they sent us out to gather pennyroyal and boneset, with the extract of which they expected to make good herb tea, always instructed us to select the herbs in full bloom. They may not have understood the chemistry of plants, but they knew from trial that these herbs while in blossom made the strongest decoctions, and that this was the time to dry them for future use. Miserable herb drink would boneset make if left in the field till the stalks and leaves were dry and the substance of the plant transformed into seed. Now dried grass is not unlike dry herbs; and a good test of the quality of hay is found in making a decoction from it, and whoever tries it will find that hay cut while the grass was in blossom makes the strongest extract. Just so the hop-grower is always careful to pick his hops, not in the old of the moon in August, as the rule of superstition has it, but when the hops are in full bloom and the pollen of the flowers most abundant, for, picked at this time, they make the strongest ale. We do not desire to make ale from our hay, but we do desire to preserve all the aroma of the flowers and all the stimulus that green hay gives to the animal system. We have heard it said that Timothy cut when in blossom is apt to be dusty. We doubt very much the truth of this. The idea probably originates from the pollen of the blossoms being scattered at the time of harvest, giving the appearance of dust; but from such dust we should apprehend no evil to cattle or horses.

A third suggestion for the improvement of our hay crop is the mode of curing and storing it. We have already suggested that hay is analogous to dry herbs, and that hay is best from which the strongest decoction can be made. Here, too, we can learn a lesson from the manner in which our mothers cured and preserved their herbs, and the Chinese their tea. If we remember our mother's custom rightly, it was not to put the herbs in the open air, exposed to sun and winds till they were crisp and brown as the leaves of autumn, but they were carefully dried in the garret, and when sufficiently dry, but still retaining the green look and plastic condition of life, were wrapped in papers and stowed in the medicine-chest. We fully believe there is such a thing as drying hay excessively, exposing it to the sun and winds till much of its virtue has escaped into thin air. Every farmer must have noticed the stimulating effect of the aroma of drying hay, which enables him to perform more labor in haying, and with less fatigue, than in any other occupation. He feels as he sticks his pitchfork into a cock of hay that it must come. A man with ordinary muscle feels that he has the strength of Ajax. Raking among the heavy windrows seems to him but play. This stimulating effect we ascribe to a principle in hay similar to the theine in tea, and to preserve this principle for the benefit of the horses and cattle should be our aim in curing hay. In order to this, hay should be exposed but little to the sun and winds, and dried, as far as possible, in the cock. Of course no good farmer will expose his hay to the dews and rains. The starch, sugar and gum of grass, which are the fat-producing qualities, are all soluble in water, and are wasted by contact with it. The hay-cap is a great improvement, as it not only keeps out the water but keeps in the theine. This stimulating principle, which, for the want of a better name, we call "theine," if it does not contribute directly to building up the animal system, at least acts negatively in preventing the waste of the tissues, acting upon the animal very much as green tea does upon man. The tired washerwoman is refreshed by her cup of tea at noon, and goes to her work after dinner with renewed energy. Beef and bread do not give her so much strength as does her coveted beverage. A toil-worn soldier once said to us as he was sipping his cup of tea of a cold winter's morning, "Good green tea sets me up for all day," and we have no doubt good green hay "sets up" the horse for his all-day labor. With many persons hay is hay, no matter whether green or brown, bright or mouldy; but there is as much difference in hay as in tea. The Chinese tell us that the young, fresh leaves are the most tender and delicate, furnish the most soluble matter, and give the highest flavor, and that the difference between green and black teas does not originate with the shrub, but in the different mode of curing. In making green tea the leaves are roasted immediately after they are gathered, and the whole operation of rolling and drying is speedy; but in making black tea the leaves are spread in the air for some time after being gathered, and when rolled are exposed again to the air for a few hours in a soft and moist state. It is, therefore, by a lengthened exposure to the air, accompanied by a slight fermentation, that the dark color is given to the black teas. Whoever prefers black hay to green can easily tinge his grass with the dark hue by exposing it to the air long enough, and we believe that more hay is damaged by this exposure than by being mowed away in too green a condition.

We desire to say one word here for the after-math, or rowen crop. This is often spoken of as of little value. We have heard it compared to the foam of sillabub, having no substance in it. It might as well be said that grass has no substance in it. Rowen is simply the green grass preserved for winter use; and for sheep, calves and milch cows we know no forage equal to it. For horses and oxen, upon whose muscular system the great tax is laid, we should prefer hay made from more mature grass that furnishes more fibrin. As in summer we turn our cows out to grass, and keep the oxen stall-fed on old hay, so in winter we should feed the milk-giving cows with rowen and the oxen and horses with more mature hay. By cutting our grass early, before the plant had become exhausted in production of seed, we have been enabled for many years to cut a second crop; and though the market price of this is always less than for the first crop, yet for feeding to certain kinds of stock we have found it preferable. One great trouble with rowen has been that it came so late in the season as to render the harvesting of it difficult, and much of it has been secured in bad condition; but with an early hay harvest, the after-math comes earlier, and by curing it mostly in the cock there is little extra labor, and it will prove a very remunerative addition to our stock of forage.

The storage of hay is another topic to which we desire briefly to call your attention. Shall we put our hay into large tight mows, or into open barns and on loose scaffolds? If curing and keeping hay is analogous to curing and keeping tea, then the larger and tighter the bays the better will be the hay. We have seen a large and famous barn with a shaft coming down in the centre of the mow for the purpose of ventilating the hay. We should as soon think of ventilating a tea-chest. We have seen other barns with wide, gaping cracks on the sides of the mows, apparently left for the purpose of admitting air to the hay; and we were advised not long since to put none but thoroughly-dried hay at the bottom of the mow, as the air could not reach this part to cure it more effectually. These facts show that the true principle in keeping hay is not universally understood. Air may be essential in the curing of hay, but not in its storage. After it is ready for the barn we would not object to having the hay sealed up hermetically. Even green grass thus sealed cannot ferment nor decay any more than does a peach when canned. Decay is only a slow process of combustion, and combustion cannot take place without air. If we examine our mows after we have put upon them some imperfectly cured hay, we shall find that it is only the top, where the air can circulate, that ferments and heats. In the olden times of New England it was customary for the country clergyman to eke out his meagre salary by cultivating a small farm, and in the haying season the farmers made what was called a bee, and on an appointed day came together and cut the minister's grass, and stored it in his barn, generally finishing the whole job in one day. It was a joyous occasion, and the farmers were early at their work, and we well remember being waked up in the morning by the merry voices of the mowers and the musical clang of the scythes as they were whetted in concert. Almost necessarily much of the hay was housed before it was thoroughly dry, but, being stored in one day, there was little opportunity for the air to act upon it. We have fed out much hay thus imperfectly cured and rapidly stored, and though the top of the mow was sometimes mouldy, the bulk of the hay came out in good condition. We very much question whether green hay placed on a scaffold would keep as well. Imperfectly cured hay, stored in a mow at intervals of a few days, will be very likely to furnish layers of musty fodder, for the surface section of each batch will thus be exposed to the air, and will ferment and mould.

In feeding hay, it is found economical to cut down the mow in sections, and not to feed from the entire surface, as the exposure to the air in this case is much less. It is often remarked that hay fed directly from the mow spends much better than when it is moved from one barn to another; and we have no doubt it is so, as the hay cannot be moved without losing a portion of its aroma. More reprehensible still is the practice of pitching on the barn floor over night what may be required to be fed out in the morning. We should as soon think of taking out of the tea-chest at one meal the allowance to be steeped at the next.

As a final suggestion for the improvement of our hay crop, we would mention a little more attention to the mowing lots. We draw on these lots annually year after year, and often make no deposits by which to enable them to honor our drafts. This is too much after the manner of the horseleech, which cries, "give, give." There is a homely proverb which says "We can't get something for nothing;" but many farmers act as though they could get grass for nothing. It *is* wonderfully cheap, and grows in spite of neglect; but there is a limit to the capacity of our meadows and pastures to produce even grass. Already the average production of the meadows of Massachusetts is less than one ton per acre, and some three or four acres of pasture are required to support a cow; whereas the average of hay should be two tons per acre, and a cow should not be compelled to traverse more than one hundred and sixty square rods of grazing for her support. How shall we bring the grass lands of Massachusetts up to this standard? We answer, by the two simple means of tile and manure. We formerly thought that manure was the foundation of good farming, but our later experience is that draining is the first thing. They certainly work well together, and neither is fully efficient without the other; but draining comes first in order of time. More of our land needs draining than is commonly supposed. Wherever water stands after a shower, or the coarse herbage shows that the roots have a watery bed, there the tile are necessary before remunerative crops can be obtained. An energetic manufacturer, who has lately turned his energies to farming, recently said to us: "Tile work like magic on my land. Where my horses could hardly walk even in a dry time I now can plough immediately after a rain." Such is the experience of all who have tried thorough drainage. Not only can the land be worked immediately after a rain, but a fortnight or a month earlier in the spring, and the lengthening of the season in the autumn is nearly as great as in the spring. Paradoxical as it may seem, the drained lands suffer much less in a drought than the undrained, the roots of the grasses having more "depth of earth," and the moisture being drawn up in due proportion by the capillary attraction of the granules of the soil, acting like small tubes, as does sugar or a lamp-wick. There are thousands of acres of mowing lands in Massachusetts where the herbage is scanty and of poor quality, not because the soil is poor, but because the roots are water-soaked. Water is good. Neither man, beast nor plant can live without it, but neither animal nor plant that is designed to live on terra-firma can flourish if compelled to make a home in water. Drainage alone will so change the character of these lands that more nutritious grasses will spontaneously spring up where the coarse aquatic plants once grew.

Wherever water stands the land must be cold. The constant evaporation carries off all the heat furnished by the earth or the sun. Every tyro that is big enough to go bathing knows that the evaporation from the surface of his body as he comes out of the water makes him shiver even in a warm summer day; and every one that has experienced this sensation should know enough not to let his land lie shivering in the wet. The quantity of heat that becomes latent by the expansion of water into vapor will surprise those that have not made accurate experiments upon it. Chemists tell us that steam contains a thousand degrees more of caloric than the water from which it is evaporated. If we can save all this caloric in the soil by draining off the surplus water, instead of leaving it to be evaporated, it will prove a great gain. When the land is thoroughly drained there will be less danger from the late frosts in spring and the early frosts of autumn. We have noticed a part of a field of buckwheat that had been drained in full bloom after a September frost, while another part, undrained, was damaged. Grass stands the cold and wet better than any other crop; but if we wish green fields early in the spring and late in the fall they must be drained and thus be rendered dry and warm. We are more and more convinced that a warm soil, other things being equal, gives great advantage, and in no way can this warmth be so effectually promoted as by the use of tile.

By draining our meadows we also double and sometimes quadruple the depth of the soil. The theory is that the land-owner owns from the surface to the centre of the earth; but practically it often happens that he owns only a few inches of the surface, for water has possession of the balance. In much of our undrained land the roots of the grasses extend down but a short distance. Meeting the cold water they are chilled and repelled. The roots of the trees even do not venture into the cold, inhospitable, watery subsoil. We have often noticed trees struggling to live in wet, undrained land. They send out their roots foraging for food, but the roots never penetrate to any great depth. They are confined to the surface, and furnish precarious sustenance and precarious foothold for the trees which are stunted in growth and are often overturned by the wind, the roots taking up with them the thin stratum of soil and exposing a subsoil almost destitute of vegetable fibre. The propensity of land-owners is to add land to land, to extend the superficial area of the farm; "to covet," as Scott says, "all that lies contiguous to us." Will it not be just as laudable an ambition to extend our possessions perpendicularly as laterally? Is there not as much satisfaction in harvesting two tons of hay from one acre as the same amount from two acres? This creating good land from poor, making ten blades of grass to grow where one grew before, furnishes a satisfaction analogous to the pleasure of the Creator, who looked upon the works of his hands and pronounced them good. Adding acre to acre is merely a commercial transaction, and shows depth of purse rather than of mind. We have no objection to large farms if the capacity of the landlord is equal to the extent of his domain; but to skim over a great surface for a little produce is neither pleasurable nor profitable. Our meadows have been specially exposed to this skimming process. In the case of our hoed crops, we know it will not pay to plough and waste our seed and the sweat of our brow upon cold, wet land; but our meadows we have been inclined to treat as though grass could grow anywhere. Grass is very accommodating and does try to grow in the most uncongenial soil; but a few tile underneath the surface give great aid and comfort even to grass.

When land is drained the air penetrates the soil, decomposing dead vegetable and animal matter, and recomposing it into new life. This twofold action of air is wonderful. No sooner does an animal or vegetable die than the oxygen of the air seizes upon it to resolve it into its elements, and reconstruct these elements into new forms of life and beauty. But this process cannot go on when air is excluded by water. Witness our muck swamps, which are vast accumulations of vegetable matter, kept from decay because covered with water. When drained, the muck begins to decompose, the swamp settles, and the nutritious grasses make their appearance upon its surface. Not only does the air penetrate the drained land, but the rains, bringing with them the nutritious gases of the atmosphere, descend and percolate through the soil, leaving these gases for the nourishment of plants. This is the normal mode in which water should act upon our meadows. They like to *drink* water as man drinks it, but are just as much opposed to being drowned as man is.

Drainage, however fundamental it may be for the improvement of our grass crop, is not alone sufficient to accomplish all that is needed. Most of our meadows must be top-dressed if we desire them to accomplish all that their capacity allows. Draining is the forerunner of manuring, and prepares the way for the efficient action of the manure. Subtracting the water does indeed allow the vegetable and mineral matter already in the soil to be digested by the plant; but few New England lands have all the food that plants need, and the deficiency we must supplement from the compost heap. We know no crop that feels the quickening influence of manure sooner than grass, nor any that yields a more grateful return. Manure applied to a hoed crop increases weeds as well as the crop; but applied to grass land we have ever found the grasses to get the ascendancy, and the grass improves in quantity and quality year after year. It is just as unreasonable to suppose that meadows can endure perpetual cropping without some return as that ploughed land can. The meadows may endure the exhausting process longer, as in ploughing the vegetable matter in the soil is more exposed to the action of the air, and consequently wastes more rapidly; but we cannot take off two tons of hay from a meadow yearly without diminishing the potash, soda and other salts requisite in the growth of grass. Our alluvial meadows formed by the deposit of the rivers, and annually refreshed by their overflow, may not need a top-dressing. The rivers often supply all the top-dressing necessary, and would wash away a good share of what we might apply. These river meadows form our most natural and productive mowing fields, where redtop, one of our best grasses, luxuriates. All other grass lands need and should receive aid from the compost heap. We have found autumn the best time to apply this compost. It is a season of comparative leisure, the meadows are less cut up by the cartage than they are in the spring, the fields receive some protection by the compost from the rigors of the winter, and the grasses receive the stimulus and take an early start in the spring. It is objected to autumn top-dressing, by some, that the rains and winds will waste much of the fertilizing matter. If the compost is fine, as it should be, and the meadows are covered with a decent growth of after-math, as *they* should be, there is little danger of waste. It takes a great rain to wash manure from a meadow where the spires of grass are thick and of some length. If cattle are allowed to graze the mowing lots till they are bare as a bald head, then the objection of washing off the manure might have some force; but no good farmer that takes pride enough in his meadows to top-dress them will allow them to be thus overgrazed. Compost cannot repair the damage done by overgrazing. Grasses, like all other vegetation, demand an elaboration of sap in the leaves, and a return of some of this elaborated sap to the roots; and a man that shaves too closely with his mowing-machine, or allows his cattle to graze too closely, will find in his penny saved a pound lost. One of the most observing of farmers remarked to us recently that "the close grazing of meadows was the easily-besetting sin of the farming community." Top-dressing may remedy in a measure the evil effects consequent upon too close cropping, but cannot compensate for the want of that vitality in the roots which is derived from the normal breathing of the plant through its leaves. It is curious to notice how lawns that are frequently mowed manage to secure this breathing apparatus. The grasses send out numerous leaflets close to the surface of the ground, which escape the scythe of the mower, mow he ever so closely, and thus the plants are sufficiently vitalized by the action of the air to maintain a stunted growth.

This is not the time to discuss the ingredients of the compost heap which is adapted for a top-dressing of our meadows. We will only say that we have found a compost made of muck and leached ashes, in the proportion of six or eight bushels of muck to one of ashes, an excellent fertilizer for grass. The wood-ashes furnish the inorganic food in great variety, while the muck supplies the vegetable matter and renders the soil light and porous, ready to absorb the gases of the air and furnish them to the grasses as they may be demanded. In case the meadows are naturally cold and wet, abounding already in clay or peat, we should substitute, for the basis of the compost heap, sand instead of muck. Sand alone, scattered upon a peaty meadow, has a wonderful effect in warming the land and inducing the growth of sweet, nutritious herbage. Indeed, we have found that meadows, well drained, after they have been mucked for a series of years, are greatly benefited by a top-dressing of sand, or better still by a coating of the alluvial soil which is to be found on the river bank. This alluvium contains not only sand but the disintegrated granules of the various rocks and soils that the river has brought down from miles above. We have used this alluvium lately in the compost designed for top-dressing, and have been much pleased with the result. When it cannot be obtained easily, the wash of the highway or the leaf-mold from the forest answers a good purpose. The latter is particularly rich in all the elements of vegetable nutrition, and our forests can well spare some of it for the benefit of the meadows.

On a clover ley plaster operates most favorably. Spread broadcast early in the spring, at the rate of one hundred pounds to the acre, it increases this leguminous crop greatly. This great result from so small a quantity cannot be attributed solely to the increase of plant-food furnished by the two main elements of plaster, sulphur and lime, although, as clover contains both these elements, they doubtless contribute directly to its nourishment. But plaster is also a great absorbent, and its efficiency must in a measure be attributed to its power of retaining the ammonia of the air, and furnishing it to the clover and other plants as they may demand. Plaster alone cannot be relied upon to keep our meadows in heart for a series of years. Those who have seen its magical effects for a year or two, and have supposed they could sell their hay and still keep up their meadows by spreading a little plaster upon them, have found themselves mistaken, and have complained that their fields became plaster-sick. The sickness was simply starvation for the want of a greater variety of food. Plaster, from its own elements, and by absorption from the air, can furnish only two of the many inorganic elements which enter into the composition of all our grasses. Clover is doubtless more benefited by its action than the other grasses, as the ash of clover shows over thirty per cent. of lime. Plaster is found to act with great efficiency in connection with wood-ashes, as they supply the inorganic elements in which plaster is deficient.

Farmers may differ about the action of plaster, but in the efficiency of barnyard manure, they are all agreed, and in the production of this, hay is the main reliance. Why should not more of this manure be applied to the reproduction of hay, and thus the law of action and reaction be carried out? The more hay the more manure, and the more manure the more hay.

The CHAIRMAN. I see before me Mr. Goodman, of Lenox, who can undoubtedly tell us something about the hay crop of Berkshire County.

Mr. GOODMAN. *Mr. President and Gentlemen,*—To undertake to discuss hay after my friend Mr. Hyde has gleaned the field is very much like going on to one of his meadows with a mowing-machine after he has taken off his after-math. But I apprehend there is no topic that is discussed by farmers, particularly in Massachusetts, of more importance than the hay crop. Unfortunately, however, as to the quality of the hay, we are poorer judges than the cattle who eat it. The objects of making hay in any particular manner are twofold—perhaps more than that; in the first place, to lessen the labor of the husbandmen, and in the second place to afford proper food for cattle. We see the first exemplified when cattle are fed on hay taken in a little before the snow begins to fall, or perhaps somewhat later. As I passed through Connecticut, recently, I saw some hay still in the cock. Whether the quality had been improved by its being air-slacked up to that time, or whether the barns were all full, I had no opportunity to inquire. But I apprehend, if we should open a hotel for animals, and make a partition in each stall, and give them early cut hay on one side and late cut hay on the other, we would find that the animals were good judges enough, after trial, always to prefer early cut hay; and I think that the discussion which has been going on in the journals for some time past as to the benefits of early cut hay will do essential service, and bring us to acknowledge that the animals we put in our barns would much prefer it when cut at the proper time, with the juices in it, than when dried up; and that there is, perhaps, as much difference in the quality of the hay we give to our cattle as in the quality of the sweet corn we eat—young and tender or old and tasteless—or in the quality of the bread we eat—nice wheaten bread, or dry Graham bread, with or without butter.

But, gentlemen, we are perhaps a little too highly favored in our section of the State to talk with much discernment on the subject of manuring our grass lands, because, if the reports of some of our farmers, rendered to our agricultural societies, are true, we do not so much need manures as something to repress the great growth of our crops! From the recorded statistics it would seem that our hay and our oats and other grain grow with such extraordinary luxuriance that they certainly overbalance any returns from any other parts of the State. It is undoubtedly true that we have a favorable soil; but I am satisfied that, favorable as our soil is, we could not get along without using not only the manures that we make, but also other fertilizers and the novel modes of tillage that are now brought into practice. And this leads me to the topic on which I particularly desire to speak on this occasion. I do not rise so much to discuss the hay crop and the modes of curing hay as I do to bring to your notice generally the value of the gatherings which have taken place here within the last two or three days.

This is to most of us, particularly to those who live in the western part of the State, a novel institution—this gathering of farmers for the purpose of receiving instruction from gentlemen from different parts of this State and from other States—and we are satisfied that great benefit has accrued from it to the farmers of Massachusetts. The discussions which have taken place during the last two or three days have been general in their character. The gentlemen who come here to address us upon these subjects cannot, of course, be expected to enter into details, so that we can learn from the words they utter how to carry out the various processes they undertake to explain, but they give us general ideas upon subjects which we have not known much about before, and upon those subjects which are familiar to us they give us hints and suggestions which will be of value to us in our future operations; and we shall receive, through the report of the Board of Agriculture, these addresses in full, to which we can turn our attention and receive the information we need. I do not apprehend that we shall all agree with everything that has been said. We may not agree with all the remarks that have been made upon the subject of manures. We may not agree with the learned and genial Prof. Agassiz on the subject of glaciers.

But however we may differ on minor topics, we shall agree on the great facts. We shall agree with Col. Weld that we want men to test the manures that are offered in the market, so that we shall not be cheated; and so with regard to all the other matters that have been discussed—the dairy, by Mr. Willard, the preservation of meat, by Prof. Gamgee, whose labors, I may say, if successful in transporting the beef of Texas to European countries, will be more effectual in dictating a treaty with England than will be the labors of our talkative ambassador in that country. I say that the efforts of these men cannot but be of great benefit to the farmers of the State.

Now I came here almost a stranger to this Board of Agriculture, and comparatively so to this Agricultural College. You know that it has been related by poets that Jove sometimes nods; Homer became weak sometimes in the great strain of the Iliad; our great Daniel Webster, whom we all honor, nodded in the seventh of March speech; and Prof. Agassiz has told you that he was weak enough to oppose the Agricultural College of Massachusetts. After these great exemplars you will not be surprised that our Berkshire society, worked upon by the idea that the Board of Agriculture was an expensive institution, sent a petition to the legislature last year for its abolition. The legislature, perhaps wiser than our society, perhaps not so wise, neglected that petition, and the Board of Agriculture yet survives; and I can say, as Prof. Agassiz said with regard to the college, that I do not regret the existence of the Board of Agriculture, when we can bring together such men as are assembled here for the purpose of hearing words of wisdom from men from different parts of the State on the great subject in which we are all interested. If there was no other department in which the Board of Agriculture could do good, this ought to keep it from the grave; because I apprehend the spirit which has now been infused into this assembly will carry us along until all shall feel the benefit of an institution like this.

Why, gentlemen, there is no other department of trade or science that does not have greater gatherings than the farmers have ; and yet there is no pursuit which brings man so close to the bosom of nature, and there is no pursuit on which the welfare of the country so largely depends. Unfortunately, from the paucity of the means of information, and from the character of the employment, every farmer has had, hitherto, to fight, like Harry-of-the-Wind, in one of Scott's novels, "by his own hand," and has had no opportunity for education, no chance to raise his head from the plough or the shovel to gather the information he so much needed. But there are no men who are more willing, now that the opportunity offers, to rise above their old situation, and not only to obtain information themselves, but to allow their sons to get the information necessary for their employment. Now the great benefit of this college is not in educating us, though I apprehend there is hardly a man who would not be glad to go back and serve a year or two under the instructions of President Clark, and get all the information which that college can give ; but we feel that our sons need that institution. We feel it, because we see in every part of the world that intelligence is the governing agent. Why, it is but lately that Russia has introduced the manufacture of sugar from beets, and she was obliged to import engineers, instructors and cultivators from France, and by a positive education, similar to that which is now taking place in our college, she expects to be able to educate her young men so that she can produce from these her own educators. That is what we want to do in this country. There is no feeling so deeply implanted in the human breast as the love of nature. There is no man, whether he live in the city or in the country, who does not feel that he would like to end his days where he began them, (as most did,) in the country. There is not a man, engaged in whatsoever calling, who does not hope, sometime in the future, to own a farm, whereon to spend what he may consider, rightly or wrongly, will be the happiest days of his life. We see that feeling exhibited in every direction—in the love which men bear for landscapes which picture the country; in the high prices they pay for pictures of rural scenes, and in the stories related by poets and historians. There is no more effective narrative in ancient history than that of Thucydides, when he tells us that at the time Athens was besieged by the Spartans, the people of the country, who were driven from their rural retreats to the city, died by thousands of home-sickness. Pent up in the city, they could not survive the absence from their dairies and their farms. That is a feeling we want to foster, and that is a feeling which will be fostered by institutions such as the Agricultural College of Amherst. We want young men to come out of that college, not only for the purpose of conducting our own farms, but of conducting the farms of others who are willing to use their capital in that way, and for the purpose of spreading over the whole country a love for farming, not only as a profession but a science.

But I have detained you too long. I merely rose for the purpose of offering, on behalf of the people of Massachusetts, a resolution of thanks to the Board of Agriculture and President Clark, of Amherst Agricultural College, for the opportunity afforded us of meeting here, and gathering wisdom from the lips of those who have addressed us.

This resolution was subsequently reduced to writing, and adopted, as will be seen further on.

At this point the carcase of a sheep preserved by Prof. Gamgee's process was brought into the hall and placed upon the platform, where it attracted much attention.

Prof. Gamgee. The utilization of sheep, by transporting them to the English market, must, I hope, be henceforth a very important business. But you have heard me speak enough, and I am very anxious to show this assembly the man who has been the most enterprising in this matter, and who was guilty of inflicting me upon an American audience. I should like to have my friend, Mr. Richardson, of Newburyport, Mass., a true Yankee, come up and say what he has to say for himself, and so enable me to retire.

Mr. Richardson. I do not know why Prof. Gamgee got me up here, except to exhibit a Yankee in connection with a sheep. I happened to run across the Professor some time ago, in Europe, and found him connected with meat-preservation, which was a matter that interested me. Having been a considerable time in Texas, where sheep and beef are of little value, his process not only interested me, but the more I saw of it the more deeply I became interested, and the more confident I became in its success. One reason for such confidence was the fact very forcibly alluded to in a lecture here yesterday. The time had come when it was absolutely necessary that some process of this kind should be discovered, for the time had come when poor people could not have meat to eat, and Providence always provides for the wants of man in due time. I ate of a piece of beef that was cured in London, (the can in which it was cured being surrounded with water at a temperature of 110°, for ten days,) which was as perfect a piece of beef as I ever tasted, both warm and cold. That interested me. The animal was killed on the 2d of March, and a quarter of the beef was cured in London, off which we dined at Prof. Gamgee's on the 13th of April. The balance of it was kept in his kitchen until the 18th of June, in the open air, and we dined off it again. There was some left, and a piece was sent to New York, arriving there about the first of July. A peculiarity of this process is that in hanging this meat in the open air a very thin coating dries upon the surface, and when you cut through that the juices of the meat appear the same as when killed. My son cut off this thin coating, and took a piece of this beef to an experienced butcher in Washington Market, and he looked at it, smelt of it, and said possibly it might have been killed a day and a half.

I have been six months in Chicago preserving meat by this process. Before I went, there was some preserved in New York. Prof. Gamgee preserved a sheep. (I speak of this to illustrate the simplicity of the process.) A young man, some twenty years old, saw him prepare the gas and go through with the process of preserving the sheep, and the next day that young man went through the process and preserved a sheep rather better, everybody said, than the Professor himself.

Now, if the Professor had any malice in bringing me up here in connection with this sheep, I feel a little inclined to pay him off. The Professor tells you that it takes from five to twenty days, according to the thickness of the meat, to cure it. Well, he is authority upon this subject. This is an English discovery, and an Englishman is fully entitled to the credit of it; but of course Yankees will improve upon it. Now, none of you who have seen the Professor will say, I think, that he is at all slow, and those who are better acquainted with him than you are have still less reason to think there is anything slow about him; but, as an American, I say it takes from twenty-four hours to five days to cure. I speak from six months' observation of the Professor's operations, and six months of very practical operations under his instructions at Chicago. I am certain that in twenty-four hours I can cure poultry perfectly. I have some chickens in Chicago that were cured there last June. I have had beef that was cured in thirty-six hours that was as perfect six weeks afterwards, when we ate it up, as the day it was killed. How much longer it would have kept I don't know; but I assure you it did not keep after it was cooked. As I said before, there is nothing slow in the arrangement, except in the Professor's idea that it takes a longer time than is necessary.

While up, I would like to make a single remark in illustration of the lecture that was delivered here upon the value of education to the farmer, as a means of making farming pay. Most of you have heard of Mr. Kendall, the editor of the "New Orleans Picayune." He went to raising sheep in Texas on an extensive scale. He was successful at first, and he published the results of his husbandry in that line. Before he died, however, disease got among his sheep; he did not know how to remedy the difficulty, and the result was an almost total loss. There was a friend of mine near Corpus Christi, in Texas,—not as favorable a location for sheep-husbandry as the neighborhood where Mr. Kendall was raising so many,—who commenced with fourteen hundred dollars' worth of sheep. He lived off the product of his flock, improved it as well as he was able, and in four years, counting his flock at its cash value in Texas, and what he had received from the sale of sheep and wool during the four years, the amount was fourteen thousand dollars. The difference between knowledge of how to raise sheep and the want of that knowledge is forcibly illustrated by these two cases. In the one case the man started on a large scale, and under very favorable circumstances, but for want of proper knowledge of sheep-husbandry failed in his efforts. In the other case a man who had perfect knowledge of the business was extraordinarily successful; but no more so than others may be under similar circumstances.

In reference to this matter of preserving meats, I think we have demonstrated that we can take cattle in any section of the country, when in perfect health, kill them, preserve the meat in a very short time, and send it to market, without its being heated or diseased by transportation in crowded cars, as is the case when live animals are sent to market. Until one becomes acquainted with the process, it is so new and remarkable that it is hard for people to realize that the thing can be done.

In reply to a question, Prof. Gamgee stated that flies would blow the meat in summer, and to prevent this he covered it with a thin cloth.

THE ART OF AGRICULTURE.

The Chairman announced that the next subject for discussion was the Art of Agriculture, and called upon Hon. Levi Stockbridge, Superintendent of the Agricultural College Farm, to open the debate.

ADDRESS BY HON. LEVI STOCKBRIDGE.

Mr. President and Gentlemen of the Board of Agriculture,—After the great number of essays which have been read to you, it seems to me that if I could, by a few suggestive remarks upon that subject, wake up and draw the members of the Board and others into one of our old-fashioned agricultural, home-made discussions, I should do much more than I could accomplish by reading an essay. I therefore propose, in an off-hand way, as they shall occur to me, to make a few remarks upon the art of agriculture, and hope I shall provoke somebody to follow me in the discussion.

Now, gentlemen, you will all admit, I believe, that we live in times of a remarkable agricultural awakening; that we have here, this week, seen some very remarkable convictions and conversions in the matter of agriculture and the Agricultural College. I think there is no mistake about that. But you have noticed, no doubt, that in all of these discussions here, that in all the discussions of the agricultural papers in times past, there is little, if any, talk on the subject of agriculture but what says, "the *science* of agriculture." It is all "the *science* of agriculture" nowadays. We are truly making great and rapid strides in the matter of agricultural progress—there is no mistake about this; but we are told that it is the *science* of agriculture which is working and is destined to work these wonders. We must plough *scientifically*, and we must reap and mow *scientifically*, and everything must be done *scientifically*, according to certain laid-down principles of science; while the *art* of agriculture is almost entirely kept out of sight.

Now it seems to me that our renowned friend, Prof. Agassiz, who spoke so learnedly last night of the manner in which our soil was made up by the grinding process of the glacier, and told us what this soil was, if he had been asked to practically illustrate the value of that soil by engaging in the art of agriculture upon it, would have found that the *science* of agriculture alone is not enough; that the *art* must come in somewhere, or else science is nearly valueless. I do not ignore science, by any means. Do not understand me as ignoring science in any department. I take it for granted, everywhere and always, that science is one of the chief corner-stones of advancement in agriculture. It is absolutely essential to complete and thorough success that every man who undertakes to till the soil should understand the principles of that tillage. We want to know all about geology. We want to know how our soil was made up, and of what it is composed; we want to know mineralogy; we want to know all about botany and all about zoölogy; but, after we have learned all these sciences, it is simply the *why*—nothing more and nothing less; the *how* is another and very different thing. The *why* will sleep to all eternity and be ineffective unless we know the *how*, and are able to apply it. That is the thing we want.

Now, then, science and art combined are the wedded pair that are going to accomplish these great results in the advancement of agriculture. The man who attempts to advance it entirely by science will most certainly fail, while many a man will meet with very commendable success who knows nothing of the science but is well versed in the art; but for complete and perfect success—for the highest advancement—both should be combined. This, then, is one reason why we should turn our attention more to the art of agriculture; because most of those who are leading us in this agricultural awakening talk to us only of the *science* of agriculture. There is another reason. I appeal to you, practical farmers of Massachusetts—you who till or who even superintend your own farms at the present day—do you not find that to-day there is an almost absolute famine of real skilled, practical agricultural artisans? Where to-day can be hired, for love or money, men qualified to go upon your farms and perform, in a workmanlike manner, all the various manipulations of agriculture? Where are the men, Mr. President, that you can hire to-day whom you would trust to go out upon your hillsides there in Concord and trim a vineyard? Where can you find them? I do not believe there are many men in this room you would be willing to trust there. It is so with your orchards. Where are the men who are skilled in the use of the various hand-tools of a farm, who know what they are and what they are made for, and then have the skill to use them in such a way as to accomplish the greatest results with the least outlay of physical force? Is it not rare to find such men?

It may seem to some of you a very queer assertion to say that hardly one-half of these farmers, men who have followed the plough all their days, know how to hold a plough to-day; yet I verily believe it is a fact. Half of the men who have been ploughing fifty years do not know how to guide a plough—a simple, plain instrument as that is. Some men whom I know can tell when a person takes hold of a plough whether he is a ploughman or not. You will see a vast difference between a man who does not know how to guide a plough and one who does, when they take hold of the implement. In the one case the man who knows nothing of the plough, and has no skill as an artisan to guide it, comes up to his plough as if it was a grisly bear—as if it was some animal that was absolutely to be held, and if it was not held would get away from him. When he once gets hold of it, he jerks it to the left and to the right, and then plunges its nose into the ground, and then jerks it out again, and at all times he works one way, his plough works another, and his team another. The unskilled ploughman is working at loggerheads with his team and with his plough, and the result is a poor, miserable piece of work—hard work for the man, terribly hard work for the team. You men who own teams, have you not seen this? And would you not rather have a man who knows how to guide a plough take a pair of your oxen and plough three days, than have an unskilled man plough two days? Will not the two days' work wear your team more than the other three? It seems to me it will. The man who knows what a plough is, and has the skill to use it, takes it, not as something to be held, but simply as an implement to be guided. He does not pull his plough, first one way and then another, in a frantic manner, but, with his eyes on the team, not immediately on the plough, but ten, fifteen or twenty feet in advance, he simply holds his plough upright and lets it move on with steady, even pace, holding it steadily, evenly, with no frantic motions either to the left or to the right, in or out; and you will find that his team and plough work together as with one motion, the work is perfectly executed, and done easily for himself and his team. The only difference between the two is that one knows, as an artisan, how to hold and guide his plough, and the other does not know anything about it.

That is one illustration of the difference between a man really versed in his art and one who is not. But take another instance, and one still more common. I will make the statement, and run the risk of being laughed at, that not one-half the men employed in the work know how to use so common and simple a tool as the hoe. They cannot use it as it should be used, and do not know how it should be used. Just pass by a corn-field or a tobacco field, and see the different manner in which the men use their hoes, and the different manner in which they leave their work behind them. One man uses his hoe as a butcher uses his scraper in taking the bristles from swine, and you would suppose it was made for the same purpose—to scrape the soil. Look at his work, and you will find that this man who does not know what he is about, or what his instrument was made for, touches but one-half the ground; he does not draw his hoe through it—he simply chops over half the land, and covers the other half with it, and the weeds are left in first-rate condition to grow again after he has passed over the land. Such a man works hard, and accomplishes nothing. On the other hand, a man who is skilled in his business knows what he is about when he takes up his hoe. He knows he has got just as much a cutting instrument as a razor, and that it should be drawn in the same way as a razor is drawn. Although he may be drawing it through a gravelly soil, the principle is the same, and if he is a skilled workman he will use it in the same way. Instead of chopping with his hoe, he will not even draw it at right angles with the edge, but he will draw it diagonally, as you would draw a razor, and then it will cut a great deal easier; the soil is stirred, the weeds are cut off, the work is done simply and easily, and it is done effectively. Still all the men who come to you and want to get employment will say that they know how to hoe; but I believe there are some men who have had men on their farms who claimed to be farmers, who, they were satisfied, did not know how to hoe.

These illustrations might be multiplied. It is universally so with the axe; it is so with all the various tools we use on the farm.

I will assume, then, that this is the case—that we have too little skill as artisans among our farm workmen: and the question now comes, What is the reason? Why is it that on our farms we cannot have men skilled as artisans in the use of the tools of the farm, just as much as we have skilled artisans in any of the mechanic or manufacturing arts? Well, to my mind, one reason is found in the nature of the occupation itself. In the first place, we have very little, if any, division of labor; and this is very important if we would have skill in the men who exercise this labor. We do not have one set of men to use the hoe the year round, another set of men the axe, another set the mowing machine, and so on through the ten thousand tools that we are obliged to use in our farming operations; but the same hand guides one and all. Now it is not so in other pursuits. The man who makes the twentieth part of a pin, for instance, works on that twentieth part of a pin all his life; the tools he uses to make that twentieth part of a pin he uses all his life. The man who works in any of our machine shops works at one particular thing as long as he lives. Is it not reasonable to suppose that the man who uses the same instrument always, and for an unvarying purpose, will acquire great skill in the use of that implement? Certainly. But it is not so on the farm. There we meet with obstacles that no other artisans encounter. The consequence is, that to make skilful agricultural artisans we want, in the first place, better timber to work on, and we want the men better educated than any other class of artisans, if we would have them equally good, because we require more of them. This seems to be a palpable and good reason.

Now how shall this difficulty be overcome? Let us make a practical thing of it. The trouble is, we require too much of our farmers. We require that they shall know too much to be thoroughly skilled; we require them to do too much and too many different things to expect that they shall be skilled in them all. The only remedy I can conceive of is this: that we resort more to special farming. How is it to-day? My friend Moore, for aught I know, raises grapes and asparagus and apples and cherries and grain, and has Jersey cows, and carries on almost every sort of farming operation upon a territory of sixty acres. Another man gives his attention exclusively to the raising of asparagus, and uses one set of tools and one lot of land. Now if my friend wants to be as successful in every department that he pursues, as the other man is in his special department, he must be ten times a better man; and I hardly believe, although he is a very good man, he can be that good. So you see, if we would acquire eminent skill as artisans in the various manipulations of the farm, the handling of the tools, &c., we can do it better if we would turn our attention more to special farming—take up one special branch and pursue that. But I must hasten on.

Now, if what I have laid down in this casual manner is true, then bear me out in this: that no education for the farmer can be a complete and thorough education which leaves out of the calculation the *art* of agriculture—the art of manipulating the land, handling the tools, and knowing the how, the when, the where, and all about it. No agricultural education can be thoroughly effectual and efficient which leaves that out.

Now I know that the time was when we were told that the school of agriculture should be simply a department in some college, where the bare science of agriculture should be taught. That was what was told us. We did not want any farm, it was said; we did not want any land with the agricultural school;

we simply wanted a department in some literary institution, where the science of agriculture alone was to be taught; the land and manipulations upon the land were to be left out of sight. But if what I have laid down is true—that the art is as important as the science—then no school of agriculture can be effective which leaves the art out of sight. The two should be combined and always go together.

You will excuse me, gentlemen of the Board, if I leave the subject here. I believe I have said enough to call out others, and I hope we shall have an interesting and profitable discussion.

The CHAIRMAN. Gentlemen, the subject is open for discussion, and we should be glad to hear from any gentleman who has any views to express. We have a gentleman here from Fitchburg, who is eminent as a practical farmer. I think the meeting would like to hear from Dr. Fisher.

Dr. FISHER. I did not expect to be called upon, and have but very few words to say. One or two ideas have been advanced on which I would like to say a word.

In the essay by Mr. Hyde on the hay crop, and in the discussion which followed, a good deal was said about the early cutting of grass. I believe in the early cutting of grass, and I presume I believe in an earlier cutting of grass than any gentleman in the hall. I believe that grass should be cut just at the time when cattle like it best, and that is long before it is in flower. If you will give cattle their choice, you will find that they will take invariably the earlier and shorter grass, before it throws up its flower-stem. It may be that if you cut the grass at that time you get but a very small crop, but it is just as much better as it is smaller. I have been experimenting upon this subject for some years, and I have concluded that the best time to cut herds'-grass, if I can have my choice, is when the seed-stem just begins to show itself, and when the grass averages from ten inches to a foot in height. At that time the grass contains more nutriment than it does afterwards, because as it goes on it changes to woody fibre very much faster than it increases the soluble ingredients which serve for the nourishment of the animal. I therefore intend to cut my grass at that time.

I used to make the same mistake that almost everybody does. I did not begin to cut my grass until my first field was ripe, and the consequence was, when I ended, my last grass was spoiled; which is the case with a great many farmers. It is important to cut all the grass when it is in good condition, and the only way we can get along with it is to cut the first too early. I watched my grass this year daily, and I came to the conclusion that if I had cut it all on the 15th day of June it would have been worth more money to me than if cut later. I began about the 13th of June and finished on the 3d of July. I cut my herds'-grass before it had shown a blossom, and I should be willing to put that hay before cattle by the side of any other hay, and if they did not choose mine in preference to any other I should be very much mistaken.

Then there is another thing to be considered. You get a second crop, which is large and of equally good quality. It does not disturb the digestion of animals, as rowen often does, and certainly two crops are worth more than any one crop that can be got off the land. The effect of this upon cattle is just like grass. It is dried grass; it is not chips and shavings, as a great part of our hay is. A great proportion of it is soluble, and animals thrive well upon it. It takes less to keep them; they will give more milk, make better looking butter, and more of it.

I merely wished to throw out this idea that gentlemen who are investigating this subject may experiment upon it. Such hay will do for horses, I think, better than later cut hay. It will not do to take a horse off of fine chips and put him on early cut hay at once; it will scour him; but a horse that is used to this kind of hay will thrive on a less quantity than otherwise. I have two horses now which have been kept for some years upon six quarts of meal and pretty late hay. It required that amount to keep them in condition. I now give them only two quarts of meal, (and have given them only that quantity for the last year and a half,) in combination with hay that I cut early, and they are in better condition than they were two, three or four years ago. I consider them as good arguments as I can produce. They certainly thrive better on two quarts of meal and the hay they get now than they did formerly upon six quarts of meal and late cut hay.

Mr. STOCKBRIDGE. If you were going to give the hay to working animals, would you cut the grass early or late? Does it make any difference whether it is to be given to working or milking animals?

Dr. FISHER. I believe the more nourishment hay contains the better it is for the animal, whether a working animal or anything else. It is not the woody fibre that nourishes the animal; it is the soluble constituents, the elements of starch and sugar. There is a great deal more of these soluble constituents in early cut hay than in late. My point is, that the grass blade contains more nourishment than the stock; but the stock is much more nutritive in its early stage than later.

Mr. GOODMAN, of Lenox, presented the following resolution, which was adopted: —

Resolved, That the thanks of the farmers of Massachusetts be tendered to the Board of Agriculture, and the President of Amherst Agricultural College, for the opportunities afforded, by the meetings just held, of receiving and imparting information on agricultural topics, and for the liberality displayed in procuring the attendance of the eminent gentlemen who have addressed the meeting upon special topics.

Hon. VALOROUS TAFT, of Upton. I only want to say a single word. I suppose that I represent, to a considerable extent, the feeling of the farmers of Massachusetts in reference to the Agricultural College; and I will tell you what I said to a gentlemen yesterday morning, when he asked me what I thought of that institution. I told him I was conservative, and wanted to see, before expressing an opinion, whether the thing paid; and it was for that reason, because I have some acquaintance with the farmers of the Commonwealth, that I came up here day before yesterday—that I came here last winter—that I might see with my own eyes; for sometimes, you know, Yankees think they know more if they see themselves than they do if they merely hear what other men say. I am satisfied, from what I saw last winter, and from what I have seen since I have been here, that if things go on as they have been going, the college is to be a success, and that it will have the approbation and support of the farmers of Massachusetts.

The Board then adjourned to 7½ o'clock.

EVENING SESSION.

At the opening of the evening session, the Chairman introduced Dr. HARTWELL, of Southbridge, who returned the thanks of the Board to the citizens of Amherst for the courteous and liberal hospitality extended to them during the meeting. He said:—

Ladies and Gentlemen of Amherst,—The members of the Board of Agriculture, in connection with their predecessors, thank you most sincerely for your hospitality in so liberally providing for their physical necessities; they thank you for the honor you have conferred upon them by your presence during their deliberations; they thank you for opening and warming and lighting this beautiful hall; they thank you for your patience in listening to their disjointed discussions. Pray remember that the gentlemen composing this Board of Agriculture and their predecessors, with few exceptions, have not been educated in the abstruse sciences at the polytechnic schools. We have learned our lessons patiently, practically and most laboriously upon the farm. Yet we trust and believe, that if you will examine with care and circumspection, you will find, amid the debris of our discussion, some pearls.

The gentlemen from whom you have heard addresses stand pre-eminent in connection with the subjects upon which they have so ably instructed us. The gentleman who so graphically delineated his theme last evening, (Prof. Agassiz,) has no superior in his profession in this country or in Europe.

Ladies and gentlemen, we shall leave this place to-morrow morning with the most pleasant and lively emotions, emanating from the high consideration of your kindness and attention to us; and in the future, when we shall come to ruminate upon the past, foremost in our memories will stand Amherst.

The CHAIRMAN. Ladies and gentlemen, it becomes my duty, and affords me much pleasure, to be able to introduce to you, as the lecturer this evening, a gentleman who is eminent in agriculture, and who has labored long and well and eloquently in the cause. I have the pleasure of introducing to you Dr. GEORGE B. LORING, of Salem.

THE VALUE OF AGRICULTURAL INVESTIGATION, AND THE ABILITY OF MASSACHUSETTS TO SUPPORT THE AGRICULTURAL COLLEGE.

BY DR. GEO. B. LORING.

Gentlemen,—In attempting to perform my share of the labors of this convention, I have considered the locality in which we have met and the circumstances by which we are surrounded. For the first time, the Board of Agriculture, the representatives of the practical farmers of this Commonwealth, have convened at the Agricultural College, the fountain, as we hope, of the scientific principles which are to be applied to the business of farming. The occasion is full of promise to our agricultural community—promise which, I doubt not, will be entirely fulfilled. The quality of the agricultural literature of the present day, and the condition of the agriculture of our time, as compared with the past, the necessity for good agricultural education, and the capacity of Massachusetts to place the Agricultural College on a firm foundation, as well as its duty to do so, are the topics to which I would call attention at the present time.

Lord Bacon, who had a large collection of works upon agriculture, had them one day piled up in a courtyard and set on fire; for, said he, "In all these books I find no *principles;* they can, therefore, be of no use to any man." This remarkable verdict was given, and this sentence executed in the early part of the 17th century, probably; for Lord Bacon died in 1626.

To us, this act of Bacon is significant and important. There had been many agricultural writers before that day, whose books have come down to us, and are often referred to as constituting an interesting portion of our agricultural literature. If it is indeed true that they had laid down no principles, had deduced no general laws from a long accumulation of facts, had arrived at no conclusions which attracted the mind of the great philosopher, and opened no path for his future speculations, would it not be well for us to consider what the agriculture, and society, and civil organization were, which brought forth such meagre fruits, and were obliged to leave the great foundation of all prosperity resting upon the doubtful pillars of isolated facts and traditionary rules. The books which Bacon burned, the agriculture by which he was surrounded, the state in which he lived, as compared with our own, what were they?

No doubt his library was of the best. The Greek and Roman and English writers on husbandry were all before him. He turned to Cato first, the statesman, law-giver and farmer, to find as the best thing he could say: "Our ancestors regarded it as a grand point of husbandry not to have too much land in one farm, for they considered that more profit came by holding little and tilling it well." "Burn that book," says Bacon; "it does not go beneath the surface." He took up Varro, and found that: "Nature has shown two paths which lead to a knowledge of farming—experience and imitation." "Burn that book," says Bacon; "it has nothing in it but empiricism." He opened Pliny, and learned that: "Men should plant while young, and not build till their fields are planted, and even then they should take time to consider, and not be in too great haste. It is best, as the proverb says, to profit by the folly of others." "Throw that into the pile also," said he; "it is the wisdom and not the folly of men that supplies us with knowledge." He took down Columella to find the points of a good cow, and he learned that she must be "a tall make, long, with very large belly, very broad head, eyes black and open, horns graceful, smooth and black, ears hairy, jaws straight, dewlap and tail very large, hoofs and legs moderate." "Destroy a rule," said he, "which is no more than skin deep, and at best can only apply to Columella's own province." And so Columella was consigned to the flames. Perhaps Fitz Herbert was next called upon to furnish his "principles," and as he dealt only with the prevailing practices of the times, approving some and condemning others, he, too, was obliged to follow his classical companions into the holocaust. The doggerel verse of Tusser met with no better fate. It was mainly plain statements of the practical work of farming which Bacon destroyed, without any deductions which might be of use to the general investigator. For in that day Jethro Tull had not been born, and the investigations which he made into the principles of fertility had not been heard of. All the natural sciences were silent so far as regards agriculture; and chemistry, botany and geology offered no light by which the intelligent farmer could be guided. No wonder Bacon burnt his books.

We should remember, moreover, that the agriculture of his time was rude and primitive. "At that time wheat was rarely cultivated and rarely eaten by the poorer classes. Rye, oats and barley were the prevailing crops. A naked fallow, that is to say, a year of barrenness, which was too often a year of exhausting weeds, was the ordinary expedient for restoring the fertility of the soil. Farm-yard manure, exposed to the dissolving influences of the rain, and carelessly applied, was almost the only fertilizer. Artificial grasses, with beans, pease and cabbages, were rarely grown, and turnips were confined to a few sections, and were sown broadcast. Cultivation (except ploughing and harrowing,) was performed almost entirely by manual labor; the rude implements were usually constructed on the farm, and often in a way to increase labor, instead of to economize it. The cattle were chiefly valued for their dairy qualities or for their power of draught, and were only fattened when they would milk or draw no longer. The greater number of breeds were large-boned and ill-shaped, greedy-eaters, and slow in arriving at maturity; while, as little winter food, except hay, was raised, the meat laid on by grass in summer was lost or barely maintained in winter. Fresh meat for six months of the year was a luxury only enjoyed by the wealthiest personages. "No hoed crops or edible vegetables were cultivated, and even as late as the reign of Henry VIII., Queen Catharine was obliged to send to Flanders or Holland for salad to supply her table. Neither Indian-corn, nor potatoes, nor squashes, nor carrots, nor cabbages nor turnips were known in England till after the beginning of the sixteenth century. The poor peasants subsisted chiefly upon bread made of barley, ground in a quern, or hand-mill, and baked by themselves." When Macaulay, having ascertained the fact that the sum raised by taxation in England, "in a time not exceeding two long lives, has been multiplied thirty fold," would remind those who are alarmed by the increase of the public burdens, of the increase also of public resources, he draws a picture of English agriculture in the seventeenth century, and not long after the death of Bacon, which is extremely interesting. At that time, he says, "The arable land and the pasture land were not supposed by the best political arithmeticians of that age to amount to much more than one-half the area of the kingdom. The remainder was believed to consist of moor, forest and fen. These computations are strongly confirmed by the road-books and maps of the seventeenth century. From those books and maps, it is clear that many routes which now pass through an endless succession of orchards, hay-fields and bean-fields then ran through nothing but heath, swamp and warren. In the drawings of English landscapes made in that age for the Grand-Duke Cosmo, scarce a hedge-row is to be seen, and numerous tracts now rich with cultivation appear as bare as Salisbury Plain. At Enfield, hardly out of sight of the smoke of the capital, was a region of five and twenty miles in circumference, which contained three houses and scarcely any enclosed fields. Deer, as free as in the American forest, wandered there by thousands. It is to be remarked that wild animals of large size were then far more numerous than at present. The last wild boars, indeed, which had been preserved for the royal diversion, and had been allowed to ravage the cultivated lands with their tusks, had been slaughtered by the exasperated rustics during the license of civil war. The last wolf that has roamed our island had been slain in Scotland a short time before the close of the reign of Charles the Second. But many breeds, now extinct or rare, both of quadrupeds and birds, were still common. The fox, whose life is, in many counties, held almost as sacred as that of a human being, was considered as a mere nuisance. Oliver St. John told the Long Parliament that Strafford was to be regarded, not as a stag or a hare, to whom some law was to be given, but as a fox, who was to be snared by any means, and knocked on the head without pity. This illustration would be by no means a happy one if addressed to country gentlemen of our time; but in St. John's days there were not seldom great massacres of foxes, to which the peasantry thronged with all the dogs that could be mustered; traps were set; nets were spread; no quarter was given; and to shoot a female with cub was considered as a feat which merited the gratitude of the neighborhood. The red deer were then as common in Gloucestershire and Hampshire as they now are among the Grampian Hills. On one occasion Queen Anne, on her way to Portsmouth, saw a herd of no less than five hundred. The wild bull, with his white mane, was still to be found wandering in a few of the southern forests.

The badger made his dark and tortuous hole on the side of every hill where the copsewood grew thick. The wild-cats were frequently heard by night wailing round the lodges of the rangers of Whittlebury and Needwood. The yellow-breasted martin was still pursued in Cranbourne Chase for his fur, reputed inferior only to that of the sable. Fen eagles, measuring more than nine feet between the extremities of the wings, preyed on fish along the coast of Norfolk. On all the downs, from the British Channel to Yorkshire, huge bustards strayed in troops of fifty or sixty, and were often hunted with grayhounds. The marshes of Cambridgeshire and Lincolnshire were covered, during some months of every year, by immense crowds of cranes. Some of these races the progress of cultivation has extirpated. Of others the numbers are so much diminished that men crowd to gaze at a specimen as at a Bengal tiger or a Polar bear.

"According to the computation made in the year 1696 by Gregory King," only seventy years after Bacon burnt his books and died, "the whole quantity of wheat, rye, barley, oats and beans then annually grown in the kingdom was somewhat less than ten millions of quarters. The wheat, which was then cultivated only on the strongest clay, and consumed only by those who were in easy circumstances, he estimated at less than two millions of quarters. Charles Davenant, an acute and well-informed, though most unprincipled and rancorous politician, differed from King as to some of the items of the account, but came to nearly the same general conclusion.

"The rotation of crops was very imperfectly understood. It was known, indeed, that some vegetables lately introduced into the island, particularly the turnip, afforded excellent nutriment in winter to sheep and oxen; but it was not yet the practice to feed cattle in this manner. It was therefore by no means easy to keep them alive during the season when the grass is scanty. They were killed in great numbers and salted at the beginning of cold weather, and during several months even the gentry tasted scarcely any fresh animal food, except game and river fish, which were accordingly much more important articles of housekeeping than at present. It appears from the Northumberland Household Book, that in the reign of Henry the Seventh fresh meat was never eaten, even by the gentlemen attendant on the great earl, except during the short interval between midsummer and Michaelmas. But in the course of two centuries an improvement had taken place, and under Charles the Second it was not till the beginning of November that families laid in their stock of salt provisions, then called 'Martinmas beef.'"

"The sheep and the ox of that time were diminutive when compared with the sheep and oxen which are now driven to our markets. Our native horses, though serviceable, were held in small esteem and fetched low prices. They were valued, one with another, by the ablest of those who computed national wealth, at not more than fifty shillings each."

It was in this condition of English agriculture that Bacon burnt his books, because they laid down no principles and were wholly inadequate to any work of substantial improvement. And in the years that immediately followed, the change began. After this sacrifice a new spirit was roused into action, and "the great work of interpreting nature was performed by the English of that age, as it had never before been performed in any age by any nation. The spirit of Francis Bacon was abroad, a spirit admirably compounded of audacity and sobriety. There was a strong persuasion that the whole world was full of secrets of high moment to the happiness of man, and that man had by his Maker been intrusted with the key which, rightly used, would give access to them. There was, at the same time, a conviction that in physics it was impossible to arrive at the knowledge of general laws except by the careful observation of particular facts. Deeply impressed with these great truths, the professors of a new philosophy applied themselves to their task, and before a quarter of a century had expired they had given ample earnest of what has since been achieved. Already a reform in agriculture had been commenced. New vegetables were cultivated; new implements of husbandry were employed; new manures were applied to the soil. Evelyn had, under the formal sanction of the Royal Society, given instruction to his countrymen in planting. Temple, in his intervals of leisure, had tried many experiments in horticulture, and had proved that many delicate fruits, the natives of more favored climates, might, with the help of art, be grown on English soil."

The application of principles drawn from an accumulation of facts began to produce its effects on almost every walk in life. Medicine became at once an experimental and speculative science. Sanitary regulations were introduced, and architecture, drainage and ventilation were enlisted in its cause. Political philosophy became a study. The properties of the atmosphere, the ebb and flow of the sea, the laws of magnetism, the courses of the comets, were all investigated. The constellations were mapped out. Astrology and alchemy became jests. Science became fashionable. "Chemistry, divided for a time with wine and love, with the stage and the gaming-table, with the intrigues of a courtier and the intrigues of a demagogue, the attention of the fickle Buckingham. Rupert has the credit of having invented mezzotinto; and from him is named that curious bubble of glass which has long amused children and puzzled philosophers. Charles himself had a laboratory at Whitehall, and was far more active and attentive there than at any council board. It was almost necessary to the character of a fine gentleman to have something to say about air-pumps and telescopes; and even fine ladies, now and then, thought it becoming to affect a taste for science, went in coaches and six to visit the Gresham curiosities, and broke forth into cries of delight at finding that a magnet really attracted a needle, and that a microscope really made a fly look as large as a sparrow."

Of the condition of the state when Bacon burned his books, it is necessary to say a word. It was a time when the struggle between the people and despotic power began—when "the opposition which had, during forty years, been silently gathering and husbanding strength, fought its first great battle and won its first victory in the Parliament of England." Property, education, civil rights, were confined to a few. Labor was subordinate and ill-requited. To toil meant to be poor. The luxuries of life were beyond the reach of the great mass of the people—the necessities of life were enjoyed by but few. "The tenant peasantry had no security whatever for their property till after the middle of the 15th century. If the estate was sold by the landlord they were obliged to quit all, giving up even their standing crops without compensation. They were even liable for the debts of the landlord to an amount equal to their whole property, and it was not till after that time that they were held only for the amount of rent due from them." This picture of misery and suffering which prevailed in Britain will give a tolerably fair idea of the state of things in Europe generally at the same time.

It is not surprising that the great statesman and philosopher should have destroyed all the agricultural literature of such a period which came within his reach. The facts which those books furnished offered no encouragement to his mind in the great work in which he was engaged for the benefit of mankind. Isolated instances of successful cultivation, without definite description of the soil, season, locality and chemical laws involved, were no more to him than so many parcels of the crop grown. Around the greatest and most universal of all forms of human industry had been gathered, for his mental gratification, nothing but crude traditions, absurd prejudices and a confused mass of incidents. The laws of breeding were unheard of. The production of animals for specific purposes was unknown. No analysis of soils had ever been attempted. Even a gratifying result, either of cattle husbandry or of tillage, could not be submitted to physiology for investigation and law, nor to chemistry for rule; for neither physiology nor chemistry had advanced far beyond anatomy and alchemy. In this ill-digested record known as agricultural literature could be found nothing upon which to establish a system of agricultural education; nothing which would rouse the popular mind to action, whenever social and civil burdens should be removed from the masses of men; nothing which would enable an enterprising and public-spirited land-holder to develop to its fullest extent the resources which lay hidden beneath his half cultivated acres.

When Lord Bacon set his seal of disapprobation upon the agricultural record and investigation which had preceded his time, he gave a signal for new methods in this, as he did in so many other departments of science and art. And the special privilege which we enjoy, over him and his agricultural friends, is a system of inquiry and of analysis which has already gone far towards giving us definite laws to guide us in our pursuit. In Massachusetts how steadily has this work been going on. Fifty years ago it commenced in the simple form of the agricultural society, founded for the purpose of accumulating facts and for mutual stimulus among the members, enlisting in its service the best farmers and most intelligent and enterprising citizens of the day, who felt the need of light and were willing to search for it wherever it could be found. As the work grew in importance, a Board of Agriculture was established, as a receptacle for accumulating researches and a point from which the results of careful investigations might be diffused among the people. And, finally, an Agricultural College has been endowed as the most powerful agent in the whole system of agricultural education. When we assembled here for debate and instruction, we brought with us all the experience of the past, and that spirit of inquiry which has done so much to give us a knowledge of those laws under which the practical affairs of life can be conducted. The literature which we brought with us—the observations of intelligent breeders and cultivators—the explorations of science—the speculations of educated labor, viewing with cultivated eye the work of its own hands—all call upon us to devote ourselves faithfully to that work of agricultural instruction, whose crudities were destroyed, and upon whose path new light was shed, by the fire which Bacon set in a moment of contempt and despair. No philosopher burns the books of our day. For into the great laboratory of modern science the practical farmer pours his observations ; and neither the scientific explorer nor the farmer can afford to destroy the offering. It is this which gives an Agricultural College in our own State such an important position, as the spot around which all the intellectual efforts for agriculture may cluster. As a part of our system of education it is invaluable, promising not only new sources of knowledge, but also new energy to one great means of our prosperity. It is a part of that great work which our Commonwealth is carrying on for her strength and elevation. Behind this college is a great record—around it is a great ambition—and before it is a career of usefulness of which we and our children will one day be proud—if we will but remember the great opportunities and obligations of the age in which we live. Turn with me, then, for a few moments from the intellectual, social and civil condition of that age when Bacon burnt his books, to this day of ours, in which all the influences of an educated community surround us, and Massachusetts offers her example in all endeavors for good.

Of her practical agriculture it is unnecessary for me to speak. You all know what it is;—not all high, or exact, or remunerative, but presenting examples of care and skill and intelligence worthy of all imitation, and presenting, moreover, a progressive spirit entitled in every way to the liberal bounty which the State bestows. Upon this somewhat hard soil, and in a climate by no means too genial, the light of science has been invoked to guide us on our way. I would not be extravagant in my congratulations or in my hopes; but I know there are many here whose minds must have been arrested, and whose admiration must have been aroused, by the intellectual effort which has been manifested in this hall during this prolonged meeting of this Board. We whose minds are directed especially to the practical affairs of the farm, to the construction of farm buildings, to the cultivation of crops, to the growing of fruit, and hay, and grain, and roots, and who have brought our contributions here, will not soon forget the vigor and brilliancy with which the most delicate laws of science have been presented to us as a guide in our practical affairs. We have listened with wonder to the eloquent periods of the great naturalist, as he laid bare the foundations of the earth, and revealed to us the mechanical laws by which our soils were created. We have been taught that a careful application of science will protect us in the use of those fertilizers upon which many of us depend for the profitable transaction of our business. Our attention has been arrested by the ingenious and elaborate chemical experiments which have taught us how to provide ourselves with healthful food, and how to preserve it effectually against the attacks of those putrefactive germs which swarm upon it the instant it is devoted to our purposes. We have been told what our dairy is, and have been led to believe that the laws of chemistry and mechanics will be applied to its more profitable operations. I am sure that the service performed in these high investigations by Agassiz, and Gamgee, and Weld, and Willard, will be held by us and this farming community in grateful remembrance. We have at least learned that we have in our possession the results of scientific investigations as the materials for our educational work;—and I believe that the prosperous and industrious Commonwealth in which we live has the ability to use these results to the best advantage in her system of general education. Massachusetts has the science at her hands —I am sure she will not reject it. She has a great industry in her keeping—I am sure she will protect it. And while I call upon her to patronize still her agricultural education, and to protect the property of her farmers, by State assayers to examine and test our fertilizers, and by veterinary professors to guide us in the protection of our animals, I think it proper to remind you here of her energy and enterprise in order that we may fully understand to what a system of material and educational effort her farms, and societies, and schools and colleges belong.

And now, in the first place, of her efforts to improve her material condition by all the arts of peace. More than thirty years ago she commenced a system of public improvements, by loaning her credit to the enterprise of her citizens; and the fruits of her wisdom in this respect are before us. In 1830, before a railroad was running within her limits, when her agricultural and commercial wealth constituted nearly all her resources, manufactures being still in their infancy, her valuation amounted to $208,360,403. In 1840, while her railroad system was yet in its infancy, and the effect of her loans was yet doubtful, her valuation had increased to $297,878,327. In 1860, however, under the influence of her public liberality and her private enterprises, the valuation of her property increased to $897,796,326; and in 1865 to $1,009,000,000. Of the products of her industry Gov. Bullock in his last annual message remarks: "I am enabled to announce to every holder of a Massachusetts bond, whether at home or abroad, the fact that while the first report indicated an annual product of eighty-six millions of dollars, the second of one hundred and twenty-four millions, and the third of two hundred and ninety-five millions, the fourth and last exhibits an aggregate of five hundred and seventeen millions, ($517,000,000.) And this result is yet more gratifying, and no less remarkable, when it is remembered that the increase of seventy-two per cent. on production in the last decade has been attained with an increase of only three per cent. in our population."

The indications of prosperity witnessed everywhere are not less remarkable than these figures. Under the hands of her citizens towns have sprung into existence, her streams have been directed into profitable labor, her hillsides and her valleys have been adorned with the architecture and landscape gardening of a prosperous and discriminating population. Her busy and thriving villages are a constant source of admiration; and he who knows them best will find it difficult to determine which to admire most—the evident wealth of her thriving citizens or their devotion to all measures of social reform and their high domestic virtues. This increase in valuation and resource—this constant struggle for material as well as moral and intellectual advancement—are so generally diffused that no section or county of the State can claim peculiar honor in this respect. But you will pardon me if I turn with especial pride to my own county of Essex, which advanced in valuation from $24,335,935, in 1830, to $84,637,837, in 1860; and whose products of industry increased from $39,848,019, in 1855, to $81,107,926, in 1865. Let this county not forget that to the fostering care of the Commonwealth she, as well as her sister counties, owe in a great degree their development and success. Nearly $7,000,000 loaned to railroad corporations, including the Western, Eastern, Norwich and Worcester, Troy and Greenfield and Southern Vermont, have produced an effect far greater than even that predicted by the sagacious financiers and statesmen who led the State into such enterprises.

Passing over the four hundred and twenty thousand dollars spent last year in charitable institutions, for the relief of the unfortunate, and the three hundred and thirty-three thousand dollars spent in checking and correcting crime, I call your particular attention to what is now going on and has been done for the education of the people of this Commonwealth—a subject peculiarly appropriate on this occasion.

The education of youth in "literature and sound doctrine," —intellectual, moral and religious culture—occupied the attention of the founders of our State. They had learned the importance of this at home—from the experience of their own firesides—from the dialectic necessities which attended nonconformism—from the obligation which every dissenter laid upon himself to defend his faith—from the natural impulse of a mind freed from civil and ecclesiastical bonds and left to its own independent search for truth—from the declaration of the great reformer, that "government, as the natural guardian of all the young, has the right to compel the people to support schools."

More than two hundred years ago, actuated by these principles, our feeble towns, holding a precarious existence in a savage wilderness, made grants of land for educational purposes. Amidst the hardships and in the gloomy isolation of colonial life, the stern, ascetic fathers knew and felt the first approach of sin. Satan came among them, not clad with the allurements and charms of cultivated and fashionable society, but appealing at once to their grosser passions, which the severe and rigorous restraints of law, and a somewhat hard and discouraging philosophy, irritated to a spirit of defiance and rebellion. They knew how prone to barbarism is a life in the wilderness. They knew the value of that cheerful courage with which education and religion fill the heart amidst the refinements of civilized life. And while the dark cloud hung over them, and the weight of stern endeavor pressed upon them, and the tempter assailed the secret and hidden recesses of their hearts, and there was no relief to the gray and sombre coloring of life, and there was no external beauty to cheer the soul, either of song, or picture, or church, or symbol, they frowned upon their gross and human weaknesses and turned to the school-house and the meeting-house for their support and inspiration. They believed in an educated Commonwealth, and in the power of an enlightened mind to dispel the gloom of the wilderness and to diffuse a vital heat through the coldest and darkest caverns of the human heart—the heat given to more ardent souls by music and poetry and eloquence and art, and the luxurious sublimity of architecture, expressive of human aspirations and desires.

The bestowal of gifts upon schools and colleges was the sacrifice which the Puritan made on the altar at which he worshipped. An educated man he respected—an ignorant man he despised; believing that it was "one chiefe project of y^e ould deluder, Sathan, to keepe men from the knowledge of the Scriptures." And he even witnessed with composure the operation of the school-house in bringing men to the enjoyment of suffrage, that sacred right, which he had reserved to the church alone. And his school-house brought men to a level. It revolutionized town after town, until the right to vote became as universal as the right to hold property. The right to civil position became general, and the graduate of the district passed on into the town-meeting to take his part in that controversy and debate which developed the popular powers of the times into a capacity for the largest civil duty. In many a Massachusetts town the problem of free government was worked out long before it became a national question. The equality of all boys in the school-house, the equality of all men in the town-meeting—this original colonial condition involved the necessity for larger and higher declarations. And so in one town they struck for suffrage in the beginning; in another they resolved that "all men are created equal," and enjoy the right "to life, liberty and the pursuit of happiness," and recorded the resolve on their "town-book," more than three years before the declaration of our national independence. I am sure it was the school-house which did all this; which raised the popular mind up to a general standard, of which the great men of our past history are but individual expressions; which developed a people, of whom Washington, as a warrior, and Jefferson, as a civilian, were the leaders; and which verified in its noblest sense that saying of Lord Bacon, that, "in the management of practical affairs the wisdom of the wisest man is less reliable than the deliberate and concurring judgment of common minds."

It was in accordance with the example set by the fathers that Massachusetts, while yet in her infancy as a State, placed upon her statute book "an act to provide for the instruction of youth, and for the promotion of good education." In that act the popular estimate of the value of education is embodied. With felicity of speech unusual—with a regard for religion and human elevation worthy of all praise—with an intellectual fervor which illumines the statutes, and which stands out in delightful contrast with the usual chilling expression of the law—her legislature enacted in 1789:—

"That it shall be and it is hereby made the duty of the president, professors and tutors of the University at Cambridge, preceptors and teachers of academies, and all other instructors of youth, to take diligent care and to exert their best endeavors to impress on the minds of children and youth committed to their care and instruction the principles of piety, justice, and a sacred regard to truth, love of their country, humanity, and universal benevolence, sobriety, industry and frugality, chastity, moderation and temperance, and those virtues which are the ornament of human society and the basis upon which the republican constitution is structured. And it shall be the duty of such instructors to endeavor to lead those under their care (as their ages and capacities will admit,) into a particular understanding of the tendency of the before-mentioned virtues to preserve and perfect a republican constitution and to secure the blessings of liberty, as well as to promote their future happiness; and the tendency of the opposite vices to slavery and ruin."

In this eloquent passage, not introduced here because it is new and has hitherto escaped the notice and admiration to which it is entitled, but because it will bear constant repetition, is to be found all the genius which has guided Massachusetts in her work of education. How this golden Act points to the value of religious and moral instruction! How it elevates the standard of education! How it indicates that the highest and most reliable virtues are the pillars of the State! How it appeals to all men of culture and of good principles to stand round and support popular education! How it encourages the youth of the Commonwealth to "avoid that which is evil and cleave to that which is good!" With what confidence does it build a republican constitution for a "people whose God is the Lord!"

I must believe that it is the spirit of this Act which has directed our educational system from its passage until now. And with this belief, I cannot congratulate you too warmly upon the success of Massachusetts schools and colleges. Starting forth as she did, with this high moral and religious standard, her institutions of learning have increased in number and prosperity, until she has become literally the nursery of education and educated men. In the advance guard of civilization as it travels westward, may be found her young men, graduates of her schools, prepared to plant the New England school-house within the fortifications and palisades of the frontier. Within her limits no branch of science, or thought, or speculation, or education goes unexplored. And when from the schools of the Old World the energetic and enterprising scholar turns his eye towards this country, as towards a new field for investigation, and he looks for that spot where he may find a genial atmosphere and the best fraternity of scholarship, it is Massachusetts which presents the most alluring charms. I cannot forget the encouraging and flattering fact that Massachusetts presented the most attractive home for Agassiz, when he determined to bring his scholarship to America.

And how true and dauntless has our State been in this great enterprise of popular education! In peace and in war she has never faltered. During the heavy drafts made upon her treasury during the rebellion her expenditures for education steadily increased; and when peace came, with its accumulated indebtedness, the schools received, if possible, still more earnest care. Last year the increase of scholars in our schools was over ten thousand; and the amount raised by taxation for schools was larger, by more than two hundred thousand dollars, than during any previous year. The devotion of two millions of dollars by an individual benefactor, Mr. George Peabody, for the diffusion of knowledge in the West and South-West, has excited the admiration of mankind; the amount expended by Massachusetts last year, as her *annual* contribution to the cause of learning, was larger than this by more than five hundred thousand dollars, being $2,574,974.49 in her public schools alone. In addition to this, her colleges have been liberally supported; and it has been estimated that her sons have bestowed more than a million dollars, in private subscription and bequest and donation, to the fortunate recipients of their bounty.

And now, pardon me, while I consider with you, for a moment, before we close and separate, and return to our customary avocations, the policy which naturally belongs to such a State as ours—a State which has accomplished so much, and which can only bear the burden of the past and present by being confident and bold and energetic for the future. Massachusetts has won her position as a controlling State, and her renown and honor, by calling upon the resources of her sons, with the entire and unwavering belief that her call would be answered. More than thirty years ago she commenced her policy of loaning her credit to railroad enterprises connected with her commercial efforts of various kinds. It was done with the expectation that her people would avail themselves of every opportunity afforded by these great channels of trade;—and that expectation has not been disappointed. More than thirty years ago a system of education was inaugurated here which could only succeed by the devotion and liberality of the people—by a popular determination to use all means of education, at whatever trouble and cost. It is enough to say that the system has succeeded. Eight years ago, unprepared and unaccustomed, the State was plunged into a long and exhausting war, in the prosecution of which all her resources of men, money and moral force were required, and on the result of which depended her existence as part of a free and prosperous republic. All this work of peace and war has not been done without a heavy burden of debt. In 1850 we had a mere nominal, unsecured indebtedness; in 1860 a million and a half of dollars would have paid all claims against us; in 1863 the obligations of the State had increased to a little more than eleven millions; in 1864 to nearly fourteen millions; and in 1867 it amounted to $25,520,995.92, of which $14,427,585.24 are provided for by sinking funds, &c., applicable by law to the redemption of the public debt, and leaving more than nine millions unprovided for, except so far as depends upon the energy, industry, honesty and success of the people. And when I allude to that policy which naturally belongs to our State, I mean that policy which will enable her to bear this debt, and pay it without discouragement to her sons and without checking that industry which has made her great and prosperous.

Now, I know no way to do this except by a constant appeal to that energy and business capacity which have marked her course thus far, and to that incessant struggle for moral and intellectual elevation for which she has become distinguished, believing as I do that prosperity and virtue go hand in hand, and that neither can desert without injury to the other.

While, then, we should exercise economy, prudence and sound judgment in the prosecution of public works, and in all appropriations for the public benefit, we cannot pause now in our career, in that policy laid down for our development more than thirty years ago, with safety and impunity. That policy which has made us great can make us greater. But for those railroads which the State aid has brought into being the valuation of the Commonwealth would fall far short of what it now does, and the honor of the Commonwealth would have been shorn of its proportions by its inability to bear the burden of war, in accordance with its desires and ambition. The policy which has brought us to our present position can alone sustain us and carry us through. We may think it is economy to stop our public works, we may think it is prudence to suspend our public enterprise, but it seems to me hardly prudent or economical to curtail our resources when most needed, or to cast doubt upon our capacity to meet our liabilities when a well-established credit is of the utmost importance.

It must have become apparent that the secret of our material prosperity lies in the constant encouragement which has been offered to that portion of the capital of our Commonwealth, the product of our labor both intellectual and physical, which is engaged in active, vigorous business—that capital which not only constitutes the strength of trade, but which also passes rapidly through the channels of business and supports the credit of the community. It is this which constitutes our real wealth. It is this which has filled our valleys with woollen and cotton mills, with mechanical industry of every description, pouring into the market every conceivable article of necessity and luxury, and peopling the Commonwealth with a thriving population, whose taste in ornamenting their estates and whose liberality and good deportment are a constant source of admiration. Add to these the farmers of our Commonwealth, whose lands have been largely increased in value by the enterprise to which I have alluded, whose products now find ready sale in a neighboring market, and whose farms everywhere bear the marks of growing prosperity, and you have a population requiring only continued activity to enable them to relieve themselves from all existing burdens, and an amount of floating capital which, in spite of fluctuations, will always stimulate the laboring and trading energies of our people.

As the policy of the State has thus far found abundant exercise for this material force, and has roused every branch of industry to its utmost capacity, so it has made this force the fountain from which our revenues are chiefly derived. It is upon the active capital and industry of our State that taxation mainly falls. It does not bear specially on labor, in a community organized as ours is ; for while rent and food and clothing rise, labor follows in the same path, and the producing capitalist depends upon the laboring consumer for that very material out of the production of which he is to pay his taxes and support himself. The theory that taxation is peculiarly a burden to the laborer, which applied when our State was mainly agricultural, and the enterprise small, and the amount of labor required was at the mercy of an industry which could afford to stop until the skies grew brighter and "times were easier," has become materially modified before that condition of active industry which cannot afford to suspend operations, and which must pay for labor in proportion to the demand. Neither does taxation fall heavily on him who has retired with an accumulated wealth, which can be withdrawn from the channels of trade and may find investment beyond the reach of assessment. But it is the property invested in railroads and mills and ships and farms and buildings, all kept alive by the application of active business forces, which enables the State to bear her burden of debt. And we may not forget that the value of property does not always depend upon exemption from taxation, but upon its connection with a community in which all its resources are developed and brought into requisition. If we would make our taxation easy, therefore, let us increase our wealth. By opening new avenues, by making our State a highway from the West to tide-waters, by multiplying opportunities for agricultural and mechanical industry, by affording every inducement to capital to find investment here, may we continue that prosperity which has thus far attended our career.

Upon the encouragement of all activity in this manner depends, I am satisfied, the growth and continuance of our educational system, of which we are so justly proud. It is an industrious people which demands education. Let me know that the community is earning money to pay its taxes by generally diffused and unflagging energy, and I have no fear that its schools will decay. I know the disasters which have fallen upon the universities and colleges of Europe, when the government upon which they depended for support had become bankrupt through the weakness or mismanagement of a monarch. But when I have seen a free people, dependent upon education largely diffused for their popular existence, increasing their contributions to education as their taxes have increased, I have learned the difference between an enlightened and educated community bravely bearing the load which they have imposed upon themselves, and a nation composed of a bankrupt nobility on the one hand, and an ignorant and half-civilized peasantry on the other. The future prosperity of Massachusetts lies on the road which she has always travelled; and all along that road stand her churches and school-houses, calling upon her people to be true still to her ancient principles. She has been industrious and bold in time past—let her be so now. She has been generous to her defenders—let her not forget to be generous still, now that the danger is over. She has planted herself on the doctrines of social morality and civil honor and integrity—let her not depart from those principles and resign her moral grandeur.

To us who enjoy this proud record of Massachusetts, as an educated Commonwealth, there comes the feeling of pride and satisfaction that she has not yet faltered in her course. In her early enterprise she did not hesitate; in her principles she has not wavered; in the war she did not falter. I look in vain for the time when she has been shaken in her faith or in her effort. Not for an hour has she forgotten her schools. Not even in the darkest night did she lose sight of her institutions of religion. Her bounteous hand was ever open to her sons who went forth to battle. And in no time of adversity and trial has she forgotten that her capacity for self-support lay in her unceasing encouragement of industry, and in the development of a brave popular heart and a wise popular head. Thus may she be known hereafter—not alone for her material greatness, not alone for her bravery on the battle-field, not alone that Lexington and Concord and Bunker Hill are within her borders, and that her sons were first at Baltimore and last to leave the line—but for that sobriety and virtue and intelligence and love of country which should characterize an educated Commonwealth, as the home of enlightened suffrage and universal freedom.

The CHAIRMAN. Ladies and gentlemen, the time has arrived at which this Board should adjourn. The exercises are now closed, and the Board stands adjourned.

ANNUAL MEETING IN BOSTON.

The Board met at the office of the Secretary, in Boston, on Thursday, January 28, at 12 o'clock, M.

Present: Messrs. Bassett, Blair, Boise, Brown, Bull, Clark, Clement, Cole, Davis, Durfee, Fearing, Hubbard, Johnson, King, Knowlton, Moore, Morton, Pierce, Porter, Sanderson, Slade, Stone, Thompson, Ward and Watkins.

Dr. DURFEE was requested to preside, and accordingly took the chair.

After reading the records, a committee, consisting of Messrs. King, Davis and Fearing, was appointed to consider and report upon the order of business. This committee submitted the following report:—

1st. Reports of delegates.

2d. Reports of committees.

3d. All matters relating to the Agricultural College.

4th. Miscellaneous business.

It is not intended to make it out of order for a delegate to offer any miscellaneous business for the sake of reference or action at any time.

This report was accepted; when

The report upon the Middlesex South Society was presented by Mr. Thompson; that upon the Worcester North by Mr. Bassett; upon the Hampshire by Mr. Boise; upon the Hampden by Mr. Knowlton; upon the Worcester by Mr. Fearing; upon the Marshfield by Mr. Clement; upon the Union by Mr. Morton; and upon the Hingham by Mr. Ward.

These reports, after some discussion, were laid over. After the transaction of some other business, the Board adjourned.

SECOND DAY.

The Board met at 10 o'clock, A. M., Hon. ALBERT FEARING in the chair.

Reports of delegates being in order, that upon the Essex Society was submitted by Mr. Brown; upon the Highland by Mr. Slade; upon the Worcester South by Mr. Watkins; upon the Berkshire by Mr. Billings; upon the Norfolk by Mr. Hubbard; upon the Bristol by Mr. Sanderson; upon the Bristol Central by Mr. Birnie; upon the Plymouth by Mr. Porter; upon the Nantucket by Mr. Johnson; upon the Martha's Vineyard by Mr. Cole; and upon the Hampshire, Franklin and Hampden by Mr. Watkins.

These reports were laid over; when it was

Voted, That a committee of three be appointed, to select and report upon subjects for investigation and essays.

This committee was constituted by the appointment of Messrs. Clark, Birnie and Slade.

Mr. Sanderson then presented the following Report upon

AMENDING SOILS BY MECHANICAL MEANS.

To amend is to change in any way for the better. The word "mechanical," in this connection, is not so easily defined. Chemical action and changes often result in connection with the farmer's labors. These changes will be considered as mechanical means when they are induced by circumstances over which the cultivator of the soil has had control.

It will be appropriate to inquire in this connection, What is soil? Geologists have well established the fact that the surface of the earth, at a very remote period, and before it was inhabited by man, was rock; and that there was what is termed the "geological ice period;" the ice being several thousand feet thick, and covering the surface of the earth, became a slowly moving mass called "glacier."

It is further established beyond reasonable doubt that detached portions of the rock, by attrition and huge grinding processes between the ice and solid rock, produced the present mass of material called, in geological term, "drift," including the entire mass now resting on the firm rock.

The nature of this deposit must be the same throughout its entire depth, varying only as it was produced from rocks of different character, as different kinds of sandstone, limestone, and in the coarseness or fineness of the material. We have thus brought together, in a most wonderful manner, the mass of material we call "earth." And as we proceed to consider its nature, the forces that act upon it, and the power of man in controlling, in a degree at least, those forces, every step is wonderful.

Sad is the fact that so much of the fair face of the earth has been cropped again and again, without any adequate return having been made, until the amount of produce is much less than on virgin soil; and also as food for man and beast it has deteriorated in quality. We cannot doubt that a Being of such illimitable and ready resource as we see constantly evidenced has provided a soil of the proper degree of fertility, and of the proper elements to support that fertility.

The farmer is the one in fault—for the most part, at least; and that, too, when the remedy is within his reach. In searching for this remedy it will be necessary to use terms expressing the nature of the earth, air and water. And let no farmer throw down the subject in impatience, at the sight of those scientific terms he has so often detested; but consider the importance of the subject, and rest assured that with a little study the subject will become as interesting as it is important to himself.

The earth originally, or at the time it was deposited in its present position, was inorganic, or particles of rock. It has now mixed with its upper portion organic or vegetable matter, supposed to have been produced by a gradual ascent from a low order of vegetation to a higher, occupying a long period of years, before the earth was fitted for the sustenance of man.

This vegetable or organic matter is mostly carbon or undecayed organic matter, of which carbon is the dominant power, and which in a fertile soil is nearly always less than ten per cent., often less than five, of the whole cultivated soil.

Now, as nearly every product of the farm is principally carbon, the great question to be answered is, How can the great storehouses of nature—the earth, air and water—be made available resources of the farmer, so that amply remunerative crops can be produced, and at the same time a constant approach be made to a full restoration of the soil to its original fertility?

It is the interest, as it is the duty, of every owner of the soil to intelligently labor for this full restoration. And by many farmers it is believed to be fully attainable, the writer among them.

Carbon, in its properties useful to the farmer, should be well understood. It is the fuel of combustion. The rusting of iron, burning of wood or any substance by flame, the decay of any vegetable or animal matter on or in the ground, or the system of man or beast—these all can be shown beyond a doubt to be but different degrees of combustion. Air is the lighting match, as it were, to set the carbon on fire. The air is composed of two gases, oxygen and nitrogen—one part oxygen to four of nitrogen. The oxygen of the air unites with the carbon, producing combustion or decay.

Now, as vegetable growth presupposes decay or combustion, and within the soil being, as will be shown, the proper place for that combustion to take place, what is the soil's proper mechanical condition, that this decay, or combustion, as well as other processes of nature, yet to be considered, may be facilitated?

As the carbon or vegetable matter of the soil must be acted upon by the oxygen of the air to produce decay, the mechanical condition of the soil should be such as to allow the free circulation of the air to the desired depth. That this may result in the most thorough manner, a large part of New England soil must be underdrained. This should be to the depth of three and a half or four feet.

Water is often dead and stagnant on the surface and at various depths in the soil, which would be otherwise penetrated by the roots of plants and trees. The stagnant water is nearly always colder in summer than the air. Its evaporation from the surface cools the earth; whereas, if by underdrains it was permitted to pass off at once, the rays or heat of the sun would penetrate and take the place of the stagnant water, preparing the land for earlier cultivation in the spring and later growth in the fall. The water of the summer rains would also readily pass through the soil, leaving the drain often many degrees colder than when it entered, having imparted its heat to the soil. This circulation of air and water greatly promotes the pulverization of the soil, thus assisting the farmer, who is laboring by ploughing and hoeing to effect the same thing. And the heated air is doing the work in a most effectual manner down at a depth not usually reached by the plough, and thus enriching the subsoil and preparing it to be turned up to the surface, when the farmer shall have found that *there* is his source of wealth, rather than adding to his number of acres.

The effects of drought are much lessened by this drainage. In addition to the moisture held by the sponge-like soil, there is an almost constant condensation of moisture from the air as it comes in contact with particles of the soil, which are cooler than the air.

The power of the soil to absorb manurial substances is greatly increased by being thus deepened by drainage. The farmer need not have the least fear that his manure will leach down through the soil thus drained. Two vessels, with holes in the bottom, may be filled, one with a common soil, the other with pure sand ; a given amount of liquid manure from the barnyard may be poured upon each of them, and, as it passes off through the holes in the bottom, that through the pure sand will be found to retain its color and odor, while that passing through common soil will have lost completely its color and odor, being nearly as pure as spring water.

In whatever manner manurial substances come in contact with soils in good condition, their gases will be immediately absorbed and held by it firmly against any power to separate them, except the growing roots of plants.

Manurial gases are constantly floating in the air. It is thus apparent that the soil which is in the best condition, or has in its composition the most carbon or vegetable matter, will gain most from the gases which, to a greater or less degree, fill the air. Thus we see that nature will help most the farmer who does most to help himself.

These facts will appear more important when we consider that nine-tenths, and often ninety-nine one-hundredths of the dry weight of plants will become aeriform by decay and combustion, leaving but one-tenth, or less, of ashes or earthy matter.

Though not a particle of this matter is lost, yet the farmer will save most to himself who manages to have most of this decay or combustion take place in his manure heap, being well protected by absorbents, or what is better, within the soil.

The mechanical preparation of the soil by draining, pulverization and aeration, the wonderful power of the soil to absorb and retain plant-food, and some of the resources of this food, have been considered.

A few of the many other substances adding to or necessary to the fertility of the soil, their availability to the farmer, and their nature and action, will now be noticed.

A large part of plant-food is known under the name of ammonia or hartshorn. Its detection by the sense of smell is but the evidence of its escape. The farmer should be well acquainted with this gas; it is his wealth. And here, often and to a great extent, is the leakage of the farm.

Manures are valuable mainly for the amount of ammonia they will produce. This gas, it is believed, always reaches the plant through its roots. It is composed of nitrogen and hydrogen gases. Hydrogen, it is believed, is never deficient. Nitrogen is often wanting in the soil. It is of the utmost importance in the growth of all vegetables. The principal source of supply is from ammonia. Although the air is composed of about four-fifths of pure nitrogen, it is believed that plants obtain only a small amount from this source.

Almost every farm in New England has within easy reach deposits of vegetable matter called muck swamps. These deposits are as securely locked up by their dead and stagnant waters as if hermetically sealed. We have seen that a fertile soil contains five per cent.—sometimes a little more, often less—of vegetable matter. But in the muck swamp it has been proved that the deposit, after being thoroughly drained, contains sixty per cent., often, of dried vegetable matter, which only needs aeration to become an active manure, having all the elements of the most fertile and virgin soil.

The ploughing into the soil of green crops is another source of manurial supply. Red clover is among the best for this purpose. This plant, having a tap-root, draws its nourishment largely from the subsoil, bringing up to the surface *mineral* matter, the nature and importance of which will be subsequently considered. The mechanical effect of the green crop thus ploughed in is to hold the soil in lightness, and, by its decay, producing heat at the same time that it affords the best and most ready nourishment to the growing crop. Worn soils may be greatly amended in this way.

The limits of this article will not admit of a very extended notice of the mineral substances necessary to fertility. Neither will it be necessary, in view of the fact that many of them are fully supplied in the mineral portion of the earth, which constitutes more than nine-tenths of the whole cultivated soil.

The ashes of plants after combustion, often not more than one-fiftieth part of their dry weight, is the mineral portion of plants. As small as this proportion is, plants will not grow without the substances of which this mineral portion of plants is composed. They are numerous, as known in common terms. But they are mainly of two classes—alkalies and acids. These are of opposite properties. A few only of the prominent minerals necessary to vegetation under these two classes will be noticed.

Potash and lime are among the most important alkaline substances.

The principal mineral acids are found in phosphate of lime, which is also contained largely in bones, gypsum or plaster and in silicate or sand.

The farmer who has given the proper degree of attention to the draining and aeration of his land, that has been indicated, may have great confidence that these mineral substances are in large supply, and will become gradually available to his crops. The present difficulty is that they are not immediately available, from the fact that they are insoluble without the action of air, heat and water and the presence of other substances to bring them into a proper physical combination with other plant-food, so as to be easily assimilated by the roots of plants.

The probability is—indeed, we are assured that New England soil has generally all the mineral elements of fertility that are contained in even the Western prairies, the only or principal difference being in the fineness of the particles.

The slow processes of nature by which the mineral substances of the soil are comminuted may be profitably hastened by a small outlay from the income of the farm, in those substances which will act immediately and mainly upon the mineral substances of the soil to decompose them.

Potash is probably the most valuable mineral alkaline substance that can be named. It acts upon the mineral substances of the soil to decompose them. This may be returned to the soil in wood-ashes. They contain also nearly all mineral substances necessary to vegetation. The farmer may safely invest in them as his means and experience will dictate.

Chloride of sodium or common salt should be named in this connection. It may be used safely in manures in quantities large enough to destroy the seeds of weeds, and will act to decompose vegetable and mineral matter.

Lime acts powerfully as an alkaline substance, and in many ways to benefit the soil and hasten vegetation. It being comparatively a cheap commodity, it may be economically used by almost every farmer.

As containing valuable mineral acids, plaster may be named as supplying sulphuric acid, necessary to all vegetables. It is found in the ashes of plants. It is known under the name of the oil of vitriol.

Bones can hardly be deemed by the farmer of too much importance. They contain when dry one-third organic matter and two-thirds mineral. They supply phosphoric acid, a very important element in all vegetable production;—the more common name for this substance is phosphate of lime. The process of decomposing bones by the aid of wood-ashes or sulphuric acid should not only be understood, but practised, by every farmer.

Sand, or the coarser particles of soil, contains acid, and is decomposed by the action of various substances named, and supplies silicic acid necessary to give strength to the growing stalks of plants.

Much might be said of the improving of soils by mixing one with another. If clay largely predominates it should be amended by an application of sand. If the soil is too sandy, let it have an admixture of clay. The muck-bed often is composed of earthy material, as well as vegetable, and its application will serve the double purpose of manuring and altering the texture of the soil.

Intelligent care should be used to raise such crops as may be profitably expended on the farm, that the substances of which they are composed may be returned again to the soil without any loss.

There are leakages of manure on almost every farm. The owner ought to know, by actual trial, that the sink and water-closet of every ordinary-sized family are capable of enriching an acre of land every year, better, probably, than was ever done by him in his life.

Close and intelligent observation will enable every farmer to know that the character of his soil renders it adapted to the production of some particular crop better than another; and also what crops should succeed each other, so as to give such a rotation of crops as will assist in the development in the soil of those substances which the nature of each succeeding crop requires.

Nothing has been said about lessening the number of acres of cultivated land by each farmer, believing that if the importance of thorough cultivation could be shown the acres would be lessened in number or the working force of the farm increased.

There is altogether too much land under cultivation, or what is called improvement. This is indicated by the fact that it is not well done. Another fact is that too large a portion of the country is being denuded of its forests, rendering the frosts and rigors of winter more severe.

As a recuperating influence to the worn soil of our pastures, a portion of them on almost every farm should be allowed to grow up to forest, under the careful management of the owner; seeding and often transplanting trees to give a proper direction to their growth.

It is confidently recommended to every farmer who wishes to commence a system of renovation and improvement of the farm, that thorough drainage is the first step. Purchase a treatise on the subject by Waring, or some other equally good, and make the experiment, and other improvements, it is believed, will soon be sought and proved.

This day is none too soon for every farmer to believe in and put in practice a system of farming which shall aim at nothing less than the full restoration of the soil to its original fertility.

C. SANDERSON,
For the Committee.

This Report led to a lengthy and interesting discussion upon certain points, when it was recommitted.

Prof. Clark then presented the Report of the Committee upon the

CULTIVATION OF CEREALS.

The importance, necessity and value of cereals will be admitted by all. But the pressing need of raising them in our own State in greater abundance is not felt as it should be. Each year the granary of the West will recede from us and the cost of transportation be increased. This already adds more than fifty per cent. to the cost of them as they come from the hands of the farmer. If this presses upon us the need of raising more on our own soil, it also encourages it. There is no reason why we should not, in Massachusetts, raise a very large proportion of what we consume; and especially is this true of corn. We apparently neither know nor develop our own agricultural resources. Belgium sustains a population nearly three times as numerous to the square mile as in this State, and has some surplus food. Our soil may not equal Belgium in fertility, but under proper culture—*intelligent, improved culture*—we ought, at least, to supply all the cereals consumed by our people except wheat. If this be true, the importance, as time goes on, of doing it cannot be overrated; and no subject could come before this Board demanding such thorough discussion and knowledge as cereals—their nature and best modes of cultivation. We regret our means of adding to these is so small and our space so limited. We must be very brief.

WHEAT

Stands at the head of the list, both as the food demanded by man, and also as richest in all the elements which go to nourish and sustain life. It is so little cultivated that our experience in regard to it is exceedingly limited. One thing is clear. The wheat plant likes new ground best. Here little manure is needed. But on such grounds as we put it, there will be the need of deep subsoil ploughing and thoroughly pulverizing the upturned soil; if it were possible, precede it by a crop of clover to turn in. Lime and salt, also, are almost indispensable to a crop of this grain, especially on our lands. In fact, almost every fertilizer we use will help to mature a good crop.

But as M. Ville would add to his perfect manure, containing nitrogen, potash and phosphate of lime, an especial manure for cereals, viz., nitrogen, so, if we add to our manured land some sulphate of ammonia, we shall find that even the worn soil of Massachusetts can produce wheat of good quality and quantity. Winter wheat, we should think, would do best here. Sow it early in the autumn, so as to have both the root and ground covered with a good coat of leaves, and seed at the rate of two to two and a half bushels per acre, and we shall not find it a difficult task to raise wheat here. At any rate, we feel as if every inducement should be held out to our farmers to make most thorough experiments in its cultivation throughout the State.

The remarks made as to the culture of wheat will apply with almost equal force to

BARLEY.

It is, however, a grain of very much easier cultivation. It adapts itself to almost every climate. It would be found a substitute where the wheat culture fails. Probably in our State its cultivation has increased but little, if at all, for the last fifteen years, while in the United States, from the year 1850 to 1860, it increased three hundred per cent. We confess we see no reason for its neglect here. The grain is historical. From the earliest records we find it mentioned. It stands in the Bible by the side of wheat. It is a native of Syria undoubtedly. There are two kinds, winter and spring barley.

Both kinds want nearly the same soil. It flourishes best in a warm, active soil, of good loam, finely pulverized. The time of sowing of winter barley would probably be about the same as winter wheat or rye. The spring barley will do well if got in about the first of May. This is the variety usually cultivated in Massachusetts. Two and a half to three bushels per acre will seed well. It is a healthy, hardy grower; has few insect enemies, and its yield is double that of wheat. It is expressly adapted to the fattening of tender, sweet pork. Its fattening power is less than corn, and two per cent. less than rye; but having less flesh and blood-making elements, it is a grain well fitted for driving-horses, and twelve and a half per cent. more nutritious than oats.

This quality has long made it a most valuable food for invalids. It is also admirably adapted for the purpose of seeding down ploughed land to grass. For these many reasons we confess to some surprise it is not a greater favorite with our farmers. We hope to see it cultivated more, and we think it will be found a cheap, nutritious food for animals and man. But most closely allied to these cereals which have been mentioned is

RYE.

Much that has been said of the cultivation of wheat and barley applies with equal force to rye. This grain and its culture comes more into the sphere of our experience, and seems a cereal especially fitted to our New England soil, and grows finely on the poor, gravelly and sandy lands of Massachusetts.

We have no doubt it will pay for high cultivation; but it will also be remunerative and profitable where less expenditure of manure and care is made.

It wants a warm, silicious soil, and a top-dressing, upon deeply ploughed land, of wood-ashes, and muck or guano, bone-dust, stable manure, or superphosphate of lime—and you may be sure of a crop of rye. Thirty bushels of ashes, two hundred pounds of guano, or three or four hundred pounds of superphosphate—and you will have it heavily manured for rye. We believe that M. Ville's theory holds even here, and that by the use of muck, for example, you get an absorbent which gathers from the atmosphere ammonia, and in the potash both a mechanical manure and a solvent, preparing silica for the food of the plant.

Winter rye thrives best, and the character of it is finer and the berry more plump. We are aware that rye will thrive on new lands where they are thoroughly harrowed only; but upon the light and gravelly land, where we usually raise rye, we should by all means plough deep, and work the manure in from the surface with a harrow or cultivator. Sow early; on old ground the last of August or first of September. There is little danger of getting it in too early.

It is called an exhausting crop for the land; but we do not regard it especially so. We think also our farmers are not aware how well it pays for the cultivation. With a ready sale of straw at twenty dollars a ton, and the grain at one dollar and a half a bushel, with so small a yield as twenty bushels per acre, the gross proceeds are about sixty-five dollars. This we think leaves a net profit to the farmer, on the outlay, larger by far than the many per cent. profit claimed by some of our manufacturers on their goods.

Rye has fine fattening qualities; it is less suitable for horses and neat stock, but is a cheap, nutritious, palatable food for man.

OATS,

However, as another of the family of cereals, are far more exhaustive of the soil than rye. The oat is also an uncertain crop. It is the favorite of a cold, moist climate. As a spring grain, and needing moist, rich soil, it is very difficult for us to get on to the land best fitted to raise it in perfection, early enough for the full maturity of the grain before our dry term comes, which cuts off its growth at once. Many sow oats for fodder; but our experience compels us to say it is a poor substitute for good, sweet English hay.

The amount of seed per acre depends on the soil, weight of grain, and kind of oats; therefore it is difficult even to approximate to a rule in regard to it. This, however, is sure: that for fodder they should be sown thicker than for a harvest of grain.

We find some, for potato-oats as they are called, think two bushels to the acre sufficient seed. Of other oats some recommend as high as four to five bushels per acre, and sown as soon as possible after the frost leaves the ground. We think this at least would be high seeding.

The character of this grain needs no discussion. In some countries it is used for bread; but it seems hardly fit for that in the United States. It is especially adapted as a healthy food for horses, and so natural to them that they can be fed at all ages of the animal, without danger of injuring them.

This could not be said of corn—the grain we use so extensively to feed them. It is also, like barley, considered medicinal, and hence always found among the articles of diet for the debilitated and sick. There is a more unpretending, but not unimportant plant, though not a member of the family of cereals, and that is

BUCKWHEAT.

It readily accepts of a poor soil, a late sowing, and produces a generous crop. The farmer, finding he is likely to come short with his grain crop, has in buckwheat another resource. If sown as late as the 25th of June it will mature finely. It does not ask for much manure. To be sure it is a coarse grain, but very palatable to fowls, and, in the meal, to hogs and horses. Its fattening quality is not below rye or barley; and in the form of buckwheat cakes it is a luxury, when hot, upon the tables of rich or poor. Hence, permitting such late sowing, with so poor soil, so little manure, and such nutritious and fattening qualities, we think it is to have a higher place in the estimation of the coming farmers than among us now.

But above them all, in importance and excellence, stands the native of America—

INDIAN CORN.

The poor man's crop, the farmer's assurance of a return for his toil among our rocks and hills, as well as along the alluvials of our streams or the rich virgin prairies of the West, it deservedly ranks among us, in the family of cereals, as number 1. It is, after all, the most important crop to New England, and in New England, if we except that of hay. It fills more bushels than any other cereal in the United States. It has, under God's providence, saved the nation from annihilation and death more than once, and contributed largely to its unexampled prosperity.

With it our poultry, beef, pork and mutton are made. It is a rich food alike for the human and brute animal. It gives both nutrition and fat to its consumer. "Corn-fed" was once an opprobrious term, denoting coarseness and vulgarity; but it denotes at least one *well* fed. Through its strength our horses nobly toil for us. On its stimulating and palatable diet our oxen patiently do our drudgery. Though, through its hybridizing propensities, we have kinds of corn as numerous as the sands on the seashore—whether King Phillip, Dutton or Brown, red, white, yellow, or smutty white—whether grown in the Canadas or on the shores of the Southern Gulf, it is essentially the same. Though hard-shelled, it has a generous heart. Like a Yankee, under its forbidding exterior it has always something worth your attention, and, like the oyster, ever opens richer than it looks. Hence, we feel, a wise statesman will give it his attention, and a wise farmer make its growth a matter of study and experiment. We confess to a little shame at the poor figure it makes in Massachusetts, as a crop, compared with many other States in the Union. In 1840, according to the United States census, 379,000,000, in 1850, 590,000,000, in 1860, 900,000,000, and probably in 1868, 1,500,000,000 of bushels, were raised. In Massachusetts, by the same census of 1850, 2,345,490 bushels were harvested in Massachusetts; but in 1865, by the State returns, the value of broom-corn and Indian corn reached only $2,969,837. Allow for the increased price of the latter per bushel in 1865, and deduct the value of the broom-corn, and it will be seen that we do not raise as much in this State as in 1850. This looks to us almost like a forsaking the faith of the fathers and a tempting of Divine Providence, to allow ourselves thus to fall away in that element of past growth, life and prosperity in the Commonwealth. The average growth also among us, even at this day, is not more than twenty-five or thirty bushels to the acre. This is far too low for our increased knowledge in its cultivation. The average ought to be doubled.

To young farmers we say, aim to grow at least seventy-five bushels to the acre. To do this will require care in preparing the ground. Let it be a grass-sod turned over very flat, and so deeply as to leave a good loam to cover it well. This may be done in the autumn or spring. Let it be enriched with well pulverized barnyard and hog manure, or fish-guano, with salt and plaster added, at the rate of three hundred pounds of plaster and two bushels rock salt per acre, and the yield of corn will be in the ratio of the amount of manure, all other things being equal. Twenty loads, of thirty bushels each, of the barnyard manure will neither injure the soil or crop. Work it from the top with a shear-harrow without disturbing the sod. Plant three and a half feet apart. Give the hills each a great spoonful of homemade superphosphate, with five kernels of very pure, handsome seed, covered well, but not deeply. Plough, if you desire, at weeding, and finish with a careful stirring of soil around young plants and a handful of wood-ashes to each hill. Leave four stocks in the hill and cultivate with horse-hoe, after weeding, being sure not to disturb the tendrils of the roots that so nearly cover the whole soil when well grown, and you may safely count on seventy-five bushels and upward per acre. The time of planting, the Indians said, was when the oak-leaves were as big as the squirrels' ears that run along their branches—or about the 20th of May. We find on wet lands frequently fine crops where it is planted ten or even fifteen days later. We should think, as a rule, it would be better to cut up your corn from the hill, and generally about the last days of September. Stook it up at once;—it will give corn with less shrinkage, the fodder will be better, and it will save labor.

Let us only here add that we believe the time is coming when corn, as producing a cheap food for the growing population of the Old World as well as the New, will be almost invaluable.

WILLIAM KNOWLTON, *for the Committee.*

This Essay having been laid over under the rules, Mr. King, from the examining committee of the Massachusetts Agricultural College, presented the following

REPORT.

The undersigned, appointed by this Board a Committee for the visitation and examination of the Agricultural College for the year 1868, submit the following Report:—

We have visited the college, and attended the examinations of the students which have taken place at the close of each term during the year. Upon our first visit we were struck with the excellent judgment displayed in locating the agricultural school of the State in the position which it now occupies. It would be difficult to find any locality more admirably adapted to the education of young men in practical and scientific agriculture. The college farm is a large one, and embraces all that variety of soil and aspect which are requisite in raising the various crops and conducting the numerous experiments indispensable to the thorough student of agriculture. The college is sufficiently secluded to remove the student beyond the reach of various influences which, under other circumstances, might divert him from an earnest and successful prosecution of his studies. The students are very fortunate in the present condition of their own institution in being admitted to the use of the library and museums of Amherst College. We take pleasure in reporting that the students of the two colleges have had no troubles or animosities, but the intercourse between them has been mutually respectful and gentlemanly. In so conducting themselves they have all shown their discretion and good sense.

The students at the Agricultural College are good material out of which to make men. The labor which they have performed in the open air, and their gymnastics and military drill, have had an effect in developing their physique very beneficial and very decided. No band of young Spartans ever displayed more activity and vigor than these students in their manly exercises. And this physical training, instead of interfering with a due attention to studies and with good scholarship, perceptibly conduces to them. It is a significant fact that the student who earned the largest amount of money for labor on the farm was one of the very best scholars in the college. No institution can be better calculated than this to realize that happy combination of a sound mind in a sound body. In the various departments of study the students have labored with diligence and success. The young men acquitted themselves in their recitations with much credit. Some of the students bore their examinations particularly well, and we shall be surprised if they do not develop into men that the farmers of Massachusetts will hear from.

The results already attained reflect much credit on the faculty and students. And yet it would be unjust for us to forget that the institution is yet in a formative state. It would be unfair to judge it by as strict a rule as we may apply after a few more years of prosperity. There are various and urgent wants of the college that must be supplied before it can be launched on the full tide of success. It is unnecessary for the Committee to enumerate in this report what they conceive to be the present needs of the college; but we would refer to the report of the condition of the college which the trustees have made to the legislature, and state that we heartily concur with the views therein expressed as to the measures that should be taken to promote the prosperity of the college.

The action taken by this Board last year, in authorizing its Secretary to perform such services at the college as should be agreed upon between him and the trustees, resulted in an arrangement under which Mr. Flint delivered at the college a course of lectures on the Dairy and Dairy Farming.

The labors of the resident professors have been characterized by ability, earnestness and zeal. Owing to the small number of professors, and the various duties which must be performed in an agricultural college, there has not been that division of labor that is desirable. The professor of agriculture has had to perform the duties of farm superintendent, and the result, of course, has not been so favorable in the management of the farm as would have been the case if the professor could have devoted his exclusive attention in that direction.

President Clark is admirably qualified for the position he holds, by his scientific attainments, his experience, and, above all, by his enthusiastic temperament. It is impossible for the the students to escape the contagion of his enthusiasm.

As overseers of the college the Board of Agriculture may well rest satisfied in the progress of the past year, and take pride in their connection with an institution which your Committee believe will soon become a distinguished ornament of the Commonwealth.

L. Agassiz.
Geo. A. King.
J. B. Moore.

The Report, after a lengthy discussion, was laid upon the table, when the Board adjourned.

THIRD DAY.

Boston, January 30, 1869.

The Board met at 10 o'clock, A. M.

Present: Messrs. Agassiz, Baker, Bassett, Birnie, Blair, Boise, Brown, Clark, Clement, Cole, Davis, Fearing, Hubbard, Johnson, Knowlton, Moore, Morton, Porter, Saltonstall, Sanderson, Slade, Stone, Thatcher, Thompson, Ward and Watkins.

Mr. Thatcher was requested to preside, and accordingly took the chair.

Mr. Baker submitted a report as delegate to the Hampden East Society, and Mr. Thatcher one upon the Worcester West, both of which were laid over.

The report of the visiting committee of the Agricultural College was then taken from the table and accepted.

Voted, That the Examining Committee of the Agricultural College for the current year be appointed by nomination.

The committee was then constituted by the appointment of Messrs. Agassiz, Slade and Thatcher.

Voted, That the Board of Agriculture, as overseers of the Massachusetts Agricultural College, petition the legislature in aid of the petition of the trustees of said college for an appropriation for the erection of additional buildings, and for such other objects as the continued prosperity of the institution demands.

Voted, That the Secretary present the above petition to the legislature.

The following Report was presented, upon

SMALL FRUIT CULTURE.

BY A. P. SLADE.

In submitting to the Board a paper on the cultivation of the small fruits, I propose to give the best method for field culture of a crop of strawberries, as the result of a somewhat extended experience. Notwithstanding the cultivation of the strawberry has engaged the attention of fruit-growers quite extensively within the last ten years, yet the demand for this delicious fruit, at remunerating prices, is far in excess of the supply; and we see no reason why this should not continue for years to come.

The same market that consumed 2,400 boxes in 1861, at an average price of seventeen cents per box, consumed in 1868 11,000 boxes, at an average price of a fraction less than twenty-five cents. While this market increased in population during the above period about forty per cent., the increase in the consumption of strawberries was over three hundred and fifty per cent.—or, in 1861 one box would supply a family of seven, and in 1868 the same family required something over three and a half boxes. Assuming this to be a fair criterion, it is not easy to determine the exact time when the supply will be fully up to the demand.

There is evidently a growing conviction on the part of consumers that a certain amount of fruit in its season is absolutely essential to their physical well-being. Thousands have discovered in its use a cheap and wholesome luxury, in which they can indulge without materially increasing their table expenses.

It is not uncommon for writers on this subject to assert that this fruit is very easily raised, yielding enormous crops and large profits. Now, I think that the experience of those engaged in growing strawberries will bear me out in the assertion that if they harvest a fair crop as often as three years out of five they will be doing as well as they have ever done, or as well as they expect to do in future.

There is certainly no crop that requires cleaner culture, or more practical experience in its successful cultivation, or that is more injuriously affected by causes wholly beyond the control of the cultivator, than the strawberry crop. The unaccountable action of the frost in winter, the ravages of the cutworm in summer, and the sharp, scorching drouth while the fruit is ripening, are alike fatal in their results. The strawberry is found growing wild in North America even as far north as the coast of Labrador. It readily adapts itself to every variety of soil and climate, and is undoubtedly the hardiest of all the small fruits. While almost any soil, properly prepared and carefully cultivated, will produce a crop of strawberries, yet we should select a deep, rich loam, with a mixture of clay—a soil which, in my judgment, would stand the drouth in summer, and would so far resist the action of frost as not to throw out the plants in winter.

The soil should be liberally dressed with well-rotted barnyard manure, and, if not too heavy, an application of leached ashes, at the rate of 160 bushels to the acre, will be found to be exceedingly beneficial.

To prepare the plants for setting, the dead leaves and runners should be removed, and about one-third in length of the root should be cut off. If the runners are suffered to remain the plant is pretty sure to be pulled up by the hoe, in the course of the season. The rows should not be less than three feet four inches apart. The distance between the plants in the rows, or the number of plants used in setting an acre, is a point on which there is a wide difference of opinion among the most successful fruit-growers. There are those who still adhere to the old custom of setting them eight inches apart, and therefore use about 20,000 plants to the acre; while others set 16,000, and from that down to 8,000, or even 6,000. Without attempting to decide who is right in the matter, or on the exact distance apart which the plants should be set in the rows, I am inclined to the belief that the yield is not in proportion to the number of plants set to the acre, and that much money and labor are annually expended in plant-setting that yields no adequate return. In the spring of 1867 I set 4,000 plants on 150 rods of ground. The rows were three and a quarter feet apart, and the plants about three feet in the rows. The runners were carefully trained lengthwise the rows during the summer. Last spring I took up 20,000 vigorous plants, and, although the season was considered unfavorable, sold 4,000 quarts of fruit, averaging one quart to the plant. Although the result in this case was what I had hoped for, rather than anticipated, I would not recommend setting an acre with less than 6,000 or 8,000 plants; then if the cutworm occasionally destroys one the runners can be trained in so as to fill up the vacancy. The plants should be set in the spring—the earlier the better, after the ground is in a suitable condition to receive them. In regard to the future cultivation of the crop, it is sufficient to say that clean culture is absolutely essential to success. The most economical way to insure this is to hoe them well as often as twice in three weeks, from the middle of May to the first of October. It should be remembered that about nine-tenths of all the labor required in growing this crop is requisite the first year, and the ensuing crop depends almost entirely on the fidelity with which that labor is performed.

I would not advise cutting the runners, unless it was with a variety that it was desirable to cultivate in hills, but would train them in lengthwise the rows until the middle of August or the first of September, when they should be allowed to run at random for the purpose of making plants for the following year. If the plants are well set in April, about the first of June they will be handsomely in bloom, at which time the fruit-stalk supporting the blossom should be cut off with a sharp knife or a pair of scissors.

The strawberry is sure to bear the first year, and overbear, if it never does afterward; and if permitted to have its own way in this respect its vitality will be so far impaired that no subsequent nursing or treatment will restore its wonted vigor or atone for its youthful indiscretion.

About the first of December the plants should be covered with a mulch, consisting of straw, fresh or salt hay, at the rate of two and a half tons per acre. Care should be taken that it be evenly spread, and no thick flakes should be left on the plants lest they mould or die from suffocation. Trash-wood laid on the mulch will prevent the wind from rolling it up and save much trouble during the winter. This completes the first season's management, upon which the entire crop of the following year depends. It is now too late to make amends for any neglect or bad culture which the plants have suffered at our hands. The most we can hope for is that a kind Providence will restore them to us in the spring as vigorous and promising as when we took leave of them in early winter. Early in April, or when the ground ceases to freeze nights, the mulch should be removed, and the plants found between the rows should be carefully taken up with a fork, making a path about a foot wide. As the weeds make their appearance they should be pulled up by hand or removed with a garden-trowel. All that now remains to be done before the picking is to "straw them down," as it is termed. This consists simply in covering the paths with straw or old hay and carefully putting it under the fruit-stalks which incline towards the paths. While the object of this is to prevent the fruit from being gritty, by coming in contact with the ground, it at the same time makes a clean and agreeable path for the pickers. The picking season usually commences about the 12th of June and continues, on an average, seventeen days. The practice of hulling strawberries before they are sent to the market we are glad to know is being rapidly abandoned. Although the demand for hulled fruit is still considerable with a certain class of consumers, yet the fact is fast gaining ground that such fruit must be of inferior quality when compared with that which is packed with the hulls on.

Strawberry-picking usually occurs when the weather is hot; and if the fruit is not picked until it is fully ripe, (and it certainly should not be,) and the hull is then removed, the pulp is more or less mangled, and decomposition ensues; and by the time it reaches the consumer it is very evident that it is neither fresh nor wholesome, its general appearance to the contrary notwithstanding.

It will undoubtedly be expected that I should here name the varieties that I deem most profitable for general cultivation. There are several reasons why I do not feel inclined to offer advice on this point. One is, varieties which do well in certain localities are almost worthless in others. And I could not myself be induced, by the recommendation of any fruit-grower in the country, to set an acre or a half-acre of any untried variety.

The humbugs of the day are not all confined to the vendors of patent medicines or patent fertilizers. It should be borne in mind that strawberry plants, like Pinder's razors, are made to sell. How willingly, or rather how eagerly, do the public buy! The Scarlet Magnate, the Triomph DeGand and Agriculturist were each in their turn recommended to the public as possessing in an eminent degree all the qualities desirable in a strawberry for field culture. These plants were sold at high prices, and those who purchased most freely were the victims of the greatest swindle.

My advice is to test the new varieties on a small scale, showing them no more favors than they would be likely to receive in ordinary field culture. As I proposed at the commencement to give my experience, I will here say that the Wilson's Albany is the kind I use and the variety with which I have had the best success. It is a hardy plant, a great bearer; and although the berry is deficient in flavor, it is firm in texture, and reaches a distant market in good order, and is the strawberry for the million.

This I call the real Wilson's. There is a spurious plant which was used in Bristol County, prior to 1865, which passed for the Wilson's Albany Seedling. Although the fruit was very nearly the same, it differed from the genuine in many important particulars. It had a profusion of blossoms, many of which were imperfect. Its fruit-stalks were small, and so short that the fruit literally lay on the ground, and its bearing season was brought to a premature close by the drying up of both fruit and foliage. In the genuine the blossoms are nearly all perfect, the leaf is larger, the fruit-stalks strong, growing from four to ten inches in height, and continues in bearing three or four days longer than the spurious. Cutter's Seedling is a variety tolerably well adapted for field culture. It is a good bearer, has a better flavor than the Wilson's, and may take its place only where the market is near, as it does not carry well. Towards the close of the season, when the weather is hot, it becomes almost too soft to handle.

In growing strawberries, we should aim to get one good crop, and then plough under the vines; for, in point of economy, the setting of a new piece is found to be less expensive than the carrying over an old one. Where the object is to get only one crop, I do not deem it essential that particular attention should be given to the mixing of sexual varieties for fertilizing purposes. But where pistillate plants are set, and it is intended to keep them in bearing several years, I would recommend setting every tenth row with some staminate variety.

AVERY P. SLADE.

A lengthy and interesting discussion followed, in reference to varieties and the modes of cultivation, pending which the Board adjourned.

FOURTH DAY.

The Board met at 10 o'clock, A. M., Mr. SANDERSON, of the Worcester West Society, in the chair.

Present: Messrs. Agassiz, Baker, Bassett, Blair, Boise, Brown, Bull, Clement, Cole, Durfee, Fearing, Hubbard, Johnson, King, Knowlton, Loring, Moore, Morton, Porter, Sanderson, Slade, Stone, Thatcher, Thompson, Ward and Watkins.

The Essay upon Amending Soils by Mechanical Means was then presented again by Mr. Sanderson, and accepted.

The Essay presented by Mr. Slade, upon Small Fruit Culture, was read a second time by its title and adopted.

An Essay was then presented upon

COMMERCIAL MANURES.

BY ASA CLEMENT.

The Committee appointed to consider and report upon "commercial manures" have devoted some time to the collection of facts pertaining to the subject, and in learning the experience of others, which we desire to relate, together with a portion of our own transactions in that direction. We will first state, however, that the duty has not been in all respects an agreeable one; for while we desire to discourage no one from using any material which will increase the amount of the products of the soil, we have deemed it just to state some things which would seem to bear against the use of such fertilizers, if it is not borne in mind that it is the spurious articles alone against which we enter our protest. That our markets abound in adulterated materials, for which the claim to purity and genuineness is set up, no one will deny who has had experience in the purchase and use of the various fertilizers offered for sale.

To such an extent have unprincipled manufacturers, and, in some instances, vendors, gone in their swindling operations, that it has become a question whether, on the whole, farmers to-day would not be better off had they let commercial fertilizers entirely alone.

In consideration of the frauds practised, it may prove serviceable to give in detail some of the "tricks" resorted to in order with more facility to palm the contemptible conglomerations of ground oyster-shells, sand, hard coal and other cheap and worthless articles, with which barely enough of valuable ingredients have been mixed for flavoring. One of the indications that cheating is being resorted to is the extensive advertising, together with a peculiar turn at "blowing," practised by those in the trade who depend upon an annual crop of customers in order to keep their business running. This matter of obtaining customers is well understood by those sharpers, for be it known that not half the cultivators ever have purchased concentrated manures, and that new ones are induced to try their "luck" at it every year. Thus he who can "blow" most stands a good chance to catch the most gudgeons.

Another "grab" is to send a bag or barrel of a pure and valuable article—it may be of poudrette, flour of bone or other concentrated manure—to some prominent man, whose name will have influence, for his trial. The result proves in an eminent degree satisfactory, and the prominent gentleman, having received his five or eight dollars' worth as a gift, can do no less, of course, than speak and write commendatory of a manure which has produced such remarkable results. We apprehend that comparatively few of the farmers are aware, even approximately, of the number of certificates which are procured in that way, and in which those patent *soil nostrums* are lauded to the skies. Before our beard began to bleach we saw the certificates of the late A. J. Downing and the late Daniel Webster, in which the poudrette, manufactured by the Lodi Company, was highly extolled on account of its fertilizing properties. Both those gentlemen undoubtedly received a good article, and the results being satisfactory, could do no less than recommend a fertilizer of such extraordinary merit. Had Downing or Webster suspected what would follow, viz., that their names were to be used to aid in palming upon a credulous public a base coin, in the form of peat alone, at $1.50 per barrel, expenses added, their signatures would have been withheld. At the time alluded to, the Lodi Company proposed to sell seven barrels of poudrette for $10.50. We sent $10.50, received the seven barrels, used as per directions, tried, in various places and on different soils, one pint in a hill for corn, marked the rows where used, plucked the ears and measured carefully; difference where used and where not used, imperceptible. Have purchased none of the article since.

We next tried muriate of lime, a light-colored article, but found ourself *sold* again.

Used more or less of Peruvian guano till the figures reached sixty-five dollars per ton, when we discontinued its use. Our experience with that most powerful of all fertilizers convinced us that it was not good policy or economy to apply it to the same soil for a succession of years. The second application never showed so good results as the first.

The most striking and clearly apparent results from the use of guano were produced in this manner: Having some rows of nursery stock which began to assume a yellowish cast, and stinted in growth, evincing a *hungry* state, we ran the horse-plough between the rows, sprinkled after the rate of two hundred pounds to the acre where the furrow was thrown out, and levelled up again. In two weeks the foliage would turn a darker green, the bark, also, begin to assume a more healthy appearance, and the trees grow quite thriftily till the close of the season. Thus we did at different times, and with uniform favorable results. Our experiments convinced us that the guano spent its force the first year. Could discover no beneficial effect on the trees the second year. Have used Bradley's superphosphate several times, and every time resolve that that shall be the last. That manure generally pushes plant-growth for a few weeks—its force is gone, and then it leaves the crop, not to die exactly, but, like the old man's calf, to " kinder give out."

At a subsequent period bought some flour of bone—crushed bone—of Devereaux, Merchants' Row, in Boston. Some of it (the flour) had the appearance of being bewitched, for in spite of all my efforts to hold a little in hand it would crawl out between my fingers. I rather thought quicksand held the preponderance in that barrel. I noticed also that the barrel was nicely lined with paper, as I supposed to keep the stuff *in* a nearly water-tight cask. If there was any bone in that mixture I hope yet to harvest big apples and pears where the application was made. Having applied a ton, and learning that bone remains long in the soil, I yet retain a good deal of pluck on that bone-dressing, but see no good yet.

By this time, it will be understood, that, commercially viewing the matter, our ambition for experimenting has collapsed; not that our faith in bones, superphosphate, lime, ashes, plaster, fish and other substances has in the slightest degree abated, but we scarcely know how to characterize the scoundrels who will grind sand, oyster-shells, or other comparatively worthless trash, with which to adulterate, and thereby cheat confiding purchasers.

That that sort of swindling has been and is now carried on to an alarming extent is evinced by the universal testimony of all who have purchased commercial manures to any considerable extent. Ask whom we may, almost every one will acknowledge he has been victimized. On that point we desire to cite the testimony of others, some of whom write with much emphasis, having written to our associates on the Committee, and others, requesting them to relate their experience, or any facts which would be useful or interesting in making up this Report.

I will first introduce Mr. Boise, of Blandford. In his reply, he writes: "I have long since condemned all commercial manures. Money expended for them is, in many instances, capital thrown away."

Mr. Boise has evidently, like more of us, been swindled by some of the patent manure vendors. He (Boise) puts it rather strong, in our judgment; yet, as things have gone and are still going, he has evidently chosen the safer side. There is no danger of getting swindled in that direction so long as one fails to purchase.

Should any vendor leave with Mr. Boise some samples for trial, no doubt the quality would be such that he would reap a fair reward for time spent in the distribution.

John A. Morton, Esq., of Hadley, also of the Committee on Commercial Manures, writes as follows: "We use a large amount in this town of those manures—mostly fish and Peruvian guano. Formerly we used superphosphate of lime, poudrette, &c.; but those articles have mostly played out. I have used all of those humbugs, and have made up my mind they do not pay. I use lime and ashes, and compost with peat and manure—which pays. Peruvian guano, used for a tobacco crop, will pay when we can get twenty-five or thirty cents per pound for the tobacco.

"Having recently conversed with many who use largely of all kinds of commercial manures, they begin to express doubts. One gentleman told me he paid out eight hundred dollars for fish-guano, and that he did not believe it was worth two hundred dollars to him. Our soil on the Connecticut River is deep and rich, and by applying some of these stimulants we get large crops. Where no other manure is used, however, the land is running down; hence I have concluded that the best way for a Massachusetts farmer is to make all the manure he can by composting, by scraping and saving everything that can be converted into manure. Let farmers spend the money for labor which they now expend for patent fertilizers—let that extra labor be devoted to gathering and composting, and our farms will produce better crops, and we shall be gainers by the operation."

We endorse the last paragraph, because it accords fully with our own views.

In reply to interrogatories sent to E. L. Metcalf, Esq., of Franklin, Mass., the following, we trust, will be regarded as to the point at issue:—

"I will endeavor to give you my experience in special fertilizers for the past fifteen years, to the best of my ability.

"We commenced using special manures in 1854. The first bought was Prof. Mapes' superphosphate;—used it two seasons; found the profit in the wrong place for us. In 1856 bought two tons Peruvian guano, (it was pure in those days,) paying $104 for the same at our door. This paid well, and we continued to use it until the price reached $65 per ton, with thirty-five per cent. adulteration, making the cost $87.75. Here we found the profit in the wrong place. About this time Coe's superphosphate was introduced, 'warranted pure.' We bought largely; lost our money; gave up its use. We next bought of Bradley's agent, under a guarantee that it should be pure superphosphate. It was no better. We lost our temper in this instance, and have bought none since. We have used the Lodi night-soil manure. As it is made it does not pay present cost.

"We have before us two samples of superphosphate sent us by dealers, guaranteed to be pure. The acid test gives us thirty-four per cent. hard coal and sand. The price $55 per ton; thirty-four per cent. is $18.70—value $36.30 per ton, which is probably much above its true value as a manure. It is made up largely of refiners' burnt bone.

"We have used to a considerable extent pure fine-ground bone, which we buy at the mill in Rhode Island. With this we mix an equal amount of wood-ashes. If the ashes are dry, the mixture will need to be wet. It will take from one to two weeks to prepare it for use. Mix on the floor—cut it over two or three times with a shovel. Bone costs $48 per ton; forty bushels ashes $8; freight $4—total cost $60, for two tons. A better fertilizer man has never compounded. We seeded seventeen acres to grass in the fall of 1866, mostly on inverted sod, using no other fertilizer but pure ground bone. The last piece was seeded late in November. Did not come up till spring. We cut two heavy crops last season from it. It looks well now. Should not think much of bone alone on very dry inverted sod.

"We have used large quantities of wood-ashes, in fact all we can get, every year. We also use lime and salt, which we consider invaluable on certain soils. Properly prepared, it is a powerful fertilizer, and good for any crop. In gardens and fields too rich in humus or mould-bearing vines, with little fruit, in orchards troubled with borers, &c., it appears to change the chemical condition of the soil and give new life to the inert elements of fertility that are in the land. Three hundred pounds lime, two bushels salt—mix together, dry slack under cover; sow on the surface in the fall; cultivate in, if sown in the spring, in order to incorporate it with the soil. If for potatoes, use a little in the hill. From four to five hundred pounds of lime to the acre is a fair dressing on any land.

"From some unexplained cause plaster does not appear to have the same effect upon all lands. It is condemned by some and extolled by others, both sides being ignorant of the cause.

"Plaster when used alone has no perceptible effect whatever on my land. Our theory is that vegetation cannot convert to its use crude plaster; that it must be decomposed by some force or action of the elements yet imperfectly understood. Potash appears to have that effect. Soils deficient in those alkaline elements are not adapted to plaster; but when the soils are of calcareous formation, embracing lime and other alkaline elements in sufficient quantities, plaster is of great value. We have now in our barn four tons gray rock-plaster, eighty bushels leached ashes, and sixteen barrels salt, ready for use, a portion of which will be used this week as top-dressing for my grass land. We mix the whole together on the barn floor, shovel it over till well mixed, when it is ready for use. Three hundred to five hundred pounds per acre, according to circumstances. It is a good dressing. The mixture can be used with more facility before the salt is all dissolved.

"We generally use leached ashes and old fish salt; both being a little wet, will mix well with the plaster. Sometimes it is necessary to add a little water. The mixture should be dry enough to spread with the hand. We apply it in the hill for all our crops, and use it in all convenient ways. We use large quantities of muck and loam as absorbents which reduce the strength of our manure, and by adding the above mixture it is made strong and good."

Bones and ashes, lime and salt, plaster, salt and ashes, are the three compounds which are recommended by Mr. Metcalf.

Now, from our own experience and observation, together with the testimony of others, all the ingredients named we declare to be good in their place. This we do without the least hesitancy. We mean by this that all the articles named are good on some soils, and some of them valuable on all soils. It cannot, therefore, be advisable to make an indiscriminate use of those materials, maugre the success of Mr. Metcalf. Let farmers experiment on a moderate scale, to begin with, and enlarge as they learn wisdom.

In reply to a note sent to Dr. James R. Nichols, we received the following, which we highly prize:—

"I have received your very pleasant note, and it affords me pleasure to reply to your inquiries so far as I am able. In regard to grinding bones, I would say that some of the new mills are capable of grinding bones which hold all the gelatine contained in the cellular texture. These are called 'raw bones.' Steamed bones or bones subjected to the action of high-pressure steam, lose this interior gelatine, and the structure is destroyed. For making superphosphates or for dissolving in acid these are fully as valuable as raw bones, as, weight for weight, they hold *more* phosphoric acid than the raw bones; but for 'rotting' in the heap or for combination with ashes or potash the raw ground bone must be used.

"If you can collect whole bones at the price named in your letter, (one dollar per hundred pounds,) and can pound them up or break them coarsely, so as to pack them in a shallow box with good unleached ashes, pound for pound, after the manner described in my lecture, it will afford you the *cheapest* and best fertilizer you ever experimented with. Make a box about a foot and a half deep, and large enough to hold your bones and ashes, and in a few weeks you will find them disintegrated and ready for the field. If you can buy the steamed bones at $25 per ton, they are very cheap, and will pay to buy and make into superphosphate. I have a field which has been under the *exclusive* treatment with special fertilizers for four years with all the different crops, and I think you will be interested in the results."

Allow us here to remark that the writer received a very polite invitation to visit the farm of Dr. Nichols, and has felt disappointed, that he did not find time to do so.

The doctor adds, in closing:—

"I have analyzed the bone-meal made by the ——— Company, and found it pure. I cannot say how honest they have been since I made the examination. There is a vast *amount of rascality* practised by the bone-grinders and the fertilizer-makers. *We must all work together to stop it; it can be done.*"

These last remarks bring us to a point which may be regarded by many as the more difficult one to manage; for the real, practical question with the farmer of the present day is not whether he can afford to use superphosphate, but whether he can afford to be cheated through buying any of the commercial fertilizers, containing, as many of them do, from twenty to fifty per cent. of worthless materials.

In our humble judgment cultivators of the soil had better far cease to purchase until some more sure guarantee against fraud can be devised than the bare assertion of manufacturers or vendors, or the certificates with which they flood the land.

The temptation to fraudulent dealing, together with the facilities afforded, is altogether too great to be resisted by persons possessing a strong desire for greenbacks, coupled with a lack of moral principle.

The question now arises, How can a stop be put to the villany by which we have all, more or less, been made to smart? We believe with Dr. Nichols, that "it can be done," if we will all work together with that end in view.

We can conceive of three ways in which that very desirable result may be accomplished, one of which is, as before suggested, to quit buying. Another is, for every man who desires to use concentrated manures to learn to prepare the compound, if such it be. The third, let the State interfere.

It is evident the first proposition is well-nigh impracticable, there are so many fertilizing materials not procurable by the masses without the aid of commerce. That being the case, it follows that the second method cannot be adopted except to a limited extent, and by comparatively few of those whom grim necessity compels to resort to other sources than home productions for fertilizing the land.

As Mr. Metcalf has done, and as Dr. Nichols is scientifically doing, and with the instruction they and others are ready to impart, many may and will receive efficient aid in utilizing bones, ashes, lime, plaster, salt, &c. After doing all that may be done, commerce in fertilizers will, to a greater or less extent, be carried on. Hence the third and last proposition is the one to which we must look, and on which we can rely with safety, viz.: the State has a duty to perform, through her legislature, which we trust will be delayed no longer. The strong arm of the law must be brought to bear upon those who will sell for bone ground sand, oyster-shells or plaster. Let imposition in the matter of fertilizers be made a criminal and penal offence.

Let us have a law enacted by which the governor and council shall be clothed with authority to appoint an inspector or inspectors, as the exigency may be, who shall be empowered to visit the manufactories of fertilizers throughout the State, subject the materials to chemical analysis, and, whether the products of these manufactories shall be put up in bags or barrels, let them bear the great seal of the State, the inspector's brand, or any other safeguard adopted which shall protect the purchaser.

We can assure gentlemen of this Board that no Southern rebel was ever more terribly in earnest in his devotion to the lost cause than are your Committee for the enactment of a law which shall protect the purchasers of commercial manures against fraud in the purchase thereof. We write not of prices, for we are willing that such articles shall take their chance with other commodities. Supply and demand will regulate the price.

We would here close, but feel constrained to urge our friends to note carefully the statements made by Mr. Metcalf, and especially those by Dr. Nichols; also the study of the lecture given by the last-named gentleman at Salem, and published in the Secretary's Report for 1866–7. If bones can be prepared at home, of which there need not be a doubt lingering in the mind of any, why should not all available and legitimate means be used to secure to ourselves the benefit of such knowledge?

Every good and prudent housewife keeps tucked away in some secret place what is commonly called a grease-pot, where she deposits all the waste fat, for the purpose of exchanging the same for soap when the soap-man shall come along, or that she may play chemistry in the manufacture of that article, and thereby dispense with the services of that indubitable functionary, the soap-man.

Why not, then, every prudent and economical farmer have a box or barrel placed in some out of the way corner, where all the bones on which the family have exercised their carniverous propensities may be deposited for safe-keeping, until winter or a rainy day shall afford an opportunity to exercise upon them the crushing weight of the sledge-hammer, and then treat in the manner suggested by Dr. Nichols. Let us hope that the hints which have been thrown out in weakness, and for which nothing original or particularly striking is claimed, may stimulate us and others to more energetic action in reference to the subject of this Essay.

ASA CLEMENT.
JOHN A. MORTON.
E. W. BOISE.

This report having been read and laid over, the following Essay was presented upon

THE RELATION OF MANUFACTURES TO AGRICULTURE.

BY DR. NATHAN DURFEE.

The histories of the last two centuries are full of instruction, as showing us the progress of science in all the arts.

We can trace in a clear and impressive manner the true relation that exists between the manufacturing and agricultural interests of our country. In the prosecution of this subject I cannot do better than to take some limited extent of our State, and to trace out the marks of progress, and find as far as possible the causes which have produced the most happy results. I shall therefore refer to an ancient record—a transfer by deed of what is called the "Freeman's Purchase." It is a conveyance of land by the aborigines to Capt. James Cudworth and others, inhabitants of the town of Freetown.

This territory included all the tract of upland and meadow lying on the easterly side of Taunton River, bounded toward the south with the river called the Falls, or Quequechand, and so extending itself northerly until it comes to a little brook called, by the English, Stacey's Creek, which brook issues out of the woods into the marsh, or bay, of Assonet.

This tract extended four miles wide and about eight miles long. Also all the meadow on the westerly side of Taunton River, and all the creeks, coves, rivers and inland meadows not lying above four miles from the flowing of the tide.

The consideration of this purchase was twenty coats, two rugs, two iron pots, two kettles, and one little kettle, eight pairs shoes, six pairs stockings, one dozen hoes, one dozen hatchets, two yards broadcloth, and a debt satisfied to John Burns, due from Wamsitta 24th December, 1657.

This deed was given by Wamsitta, the son and successor of Massasoit and Tattapanum (supposed to be the wife of Wamsitta) the squaw sachem of Pocasset. This deed was sealed and delivered in the presence of witnesses, and duly acknowledged, June 9, 1659.

This tract of territory, heretofore uncultivated except by a wandering tribe of Indians, now became the care of an active and enterprising class of men; and at the present time you can find unmistakable evidence that much labor was bestowed in the clearing and cultivating the soil. Lots have been laid out and immense walls erected, many of which have defied the storms of an age, and are now in many places standing as erect as the day in which they were built. While whole fields are grown over with thorns and briars, everything indicates that at one period there was thrift and prosperity.

Commerce was introduced with the South and the West India Islands, and this no doubt opened a channel by which they could exchange their surplus products for some of the luxuries of life, and this for the time produced a stimulus to action. At this period our legislators did not realize the importance of devising any means for the promotion of manufacturing, so essential to the prosperity of agriculture. They were willing to leave this great and all-important branch of industry to be prosecuted by the Mother Country. I find by examining the records of the Great and General Assembly for His Majesty's province, as late as 1766, the only notice of our manufacturing interest was an Act passed for the manufacturing of pot and pearl ashes. One thing attracts our notice, the great number of old orchards, showing very conclusively that the time was when the apple was a great favorite, and the cider-mug the household god of most of the families.

A friend of mine, now somewhat advanced in life, informs me that when quite a child her chief employment on the Sabbath was to furnish from the cellar this wholesome beverage, to satisfy the wants of a large number of the neighbors, who made this day an occasion for cider-drinking and story-telling, and, I might truly add, for profane swearing.

No doubt this source of intemperance tended to demoralize the people and render the earth barren and unfruitful.

Although agriculture lies at the foundation of the wealth and prosperity of our country, still a whole nation of husbandmen, unless stimulated by other pursuits, would fall into a state of indolence and inactivity.

The start by which a people spring up and move forward along the path of enterprise, by which men begin to apply their brains, is usually a start given by trade. Where no business is pursued but agriculture men have nothing to move them on to great and noble exploits. We could refer to many striking illustrations of this subject.

I well remember a family who started for the West fifty-five years ago. They made their location in the eastern part of Ohio, what is now called Cochuckton County, town of Tiverton. They settled upon some of the most fertile lands of the State, built their log-cabin, raised a large family of children, brought them up in a state of idleness and ignorance. They were surrounded by none of those incentives to action which distinguish a great and prosperous community. They had no ambition or desire beyond an eighty-acre lot.

We visited them in the early part of June, 1848. They were dwelling in the same building erected thirty-four years before; their corn was standing in the field unhusked, and at this time but little preparation had been made for a new crop.

They seemed to have but little conception of what was transpiring in the world around. They wished not to be disturbed in their repose; their great fear was that their quiet domain would be trespassed upon by that terrible monster, the locomotive.

We will now return to the territory bounded by the Falls, or Quequechand.

The cracking of the thorns and briers in 1813 infused new life into a community which had long slumbered. The foundation of the first mill in our village was the commencement of an era never to be forgotten; and although small in the beginning, its proportions have mightily enlarged. It is surprising to see with what tenacity a community will cling to old habits and customs. Many are slow to believe that there can be any advance in the arts and sciences. They proceed from year to year in the same round of business, following in the steps of their ancestry, totally unconscious of the movements around, which are operating to promote their prosperity and happiness.

I have known men, apparently sensible men, who contended earnestly that a manufacturing community would be destructive to the interests of agriculture. These same men are now boasting of their bank stocks, and whose farms are producing more value upon one acre now than was formerly produced on ten.

The five millions deposited in the savings banks of Fall River are in a large measure the gatherings from farm produce.

Many begin to realize and confess the relation that exists between these two great leading interests of our country. The farmer has become the manufacturer and the manufacturer the farmer; many of the thousand spindles running in our city are the property of the surrounding farmers.

Many of our capitalists begin to understand what lies at the foundation of their wealth and prosperity, and they are disposed to devote large sums of their accumulated wealth to the promotion of agriculture.

The more harmoniously the different trades and occupations in life work together, the greater the success that will attend them, and the more clearly can be seen the relation that exists between them. The producer must have the consumer, and between these two great classes the merchant must stand to carry on the traffic.

The fifty-two thousand bales of cotton consumed annually in our city, the product of the Southern planters, after passing through the channels of trade, are here wrought into a belt of cloth sufficient in length to encircle this earth two and one-half times. Then these combined threads must receive the impress to meet the taste and fashions of the day, and in these wonderful processes all trades and occupations are engaged and share a part.

These two great branches of industry come together and operate in unison in the great number of labor-saving machines presented us. Here the manufacturer renders important aid to the farmer.

By the employment of these machines how truly are the heavy burdens of the farmer alleviated; what was once hard toil now becomes a sport and pleasure. As it regards our hay crop, we could not dispense with the mowing-machine, the horse-rake and the tedder; they are performing an essential part in the gathering in of this important and remunerative crop of New England. One man, with an improved mowing-machine and a pair of good horses, can perform the work of many. And not less important is the tedder, which, by its grasshopper movement, is accomplishing more perfectly, by the aid of a single boy, the work of many men; and this, too, in a shorter period of time.

These two great pursuits of life are twining around and embracing each other, so that it is often difficult to decide to which department they belong.

This subject, so full of instruction, might be pursued to an interminable length; but we close with this sentiment: Agriculture and manufacturing intimately connected; the prosperity of the one is the prosperity of the other.

NATHAN DURFEE.

The above essay having been read and laid over, it was

Voted, To appoint a committee to consider and report upon any changes necessary in the dates of holding the fairs of Agricultural Societies.

Messrs. Bassett, Thompson, and the Secretary.

The following Essay was presented upon

FARMING AS AN OCCUPATION: ITS ADVANTAGES AS COMPARED WITH OTHER BUSINESS.

BY N. S. HUBBARD.

We would not attempt to say that the different branches of industry are not almost inseparably connected; but still there is a difference in their real value to any community, as there is in the different members of the body. The hand cannot say to the foot, "I have no need of thee," or the eye to the ear, "I have no need of thee;" still if some of these members were removed the body might live and prosper. But none of them can say to the head, "We have no need of thee." So it is with the different branches of industry—none could prosper, or even live at all, without the farm.

I will first speak of farming as an occupation. We judge that it is of the first importance, as it was the first employment in which man was engaged. Adam and Eve were placed in the garden of Eden to dress it, after which they were found engaged in mechanical labor; showing that this was secondary in importance. And so it has continued till the present time.

Almost the whole thrift and prosperity of a country depends upon the amount and value of its agricultural productions. If at any time there is a scarcity of the products of the soil, it is felt through all the different branches of business. We can dispense for a time, if need be, with various articles from the merchant, the manufacturer or mechanic, without suffering loss; but we cannot dispense with our daily bread.

In deciding what vocation we shall follow, the influences that bear the most heavily upon individuals are, What business will pay best? or, in other words, How can we get the most money? —not regarding the moral influence, or what bearing such and such occupations will have upon the vital energy of man. It is not all of life to get money, or all our happiness to possess a vast amount of this world's goods. There is a desire that seems to be implanted within us to accumulate, to have something we can call our own. To carry out this idea we must put forth an effort in some direction, always feeling that the interests and happiness of others should not be disregarded. Now, what are some of the benefits of farming as an occupation? It is the healthiest employment in which man can be engaged. We continually breathe a pure atmosphere, which gives a ruddy glow of health to the cheek, a vigorous physical constitution; so that where real hardship is to be endured the yeomanry are sure to be remembered. In fact they are the real backbone of a nation.

There are many things in farming that do not pay in dollars and cents, any more than a pleasure trip to Saratoga, Niagara Falls, or to some foreign land. The architecture of our buildings, shade-trees, and ornamental shrubs, flower-gardens, or anything that adorns and beautifies, tends to please the eye and gratify the taste. With these, and the greater security of the investment, there comes greater quiet and enjoyment, although the returns may be less. In any financial crisis the farmer is the last to feel its effects, and feels it least.

In visiting last autumn the residence of the senior member of this Board, I was forcibly reminded of what the toil and art of man may do in embellishing and beautifying the farm. And when the proprietor took me over his spacious grounds and through his beautiful orchards, and I partook of the luscious fruits with which the trees were bending to their Mother Earth, and beheld the green hill-slope, the beautiful fields and smiling orchards, then I felt that "the field with lively culture green was a sight more joyous than the dead morass."

The time has been when mental energy and culture with the farmer were not thought so desirable; when it seemed to be said that all who could do nothing else would do for farmers; that anybody could work. Oxen can work; but whoever conceived the idea of placing oxen on the farm without intelligence to guide them? The day for ignorance in farming has passed, or rather for advocating it, and a brighter day has dawned upon us, when the cry is, Give us knowledge, a better understanding of the nature of soils, and the adaptation of the various fruits and flowers, of plants and vegetables, to this vast variety. We need a knowledge of chemistry, botany, mineralogy, and we are continually having the results of the most scientific and practical agriculturists collected from various sources and scattered broadcast over the land. We have our Board of Agriculture, our agricultural societies and farmers' clubs, which are discussing the different branches of agriculture.

Heretofore this has received little or no attention, while the professions and other branches of business have held their conventions, discussed their several interests, collected and diffused information, invented, sought out and introduced the improvements in machinery by which they were enabled to be more successful in their different branches of business. At length the farmer began to awake to the greater importance of his calling, and to see that to carry on his business successfully he must seek better implements and all the machinery that can be used successfully and economically in all the farm interests.

The great crop of Massachusetts, and the one that exceeds all others in value and importance, is the grass crop, so that the attention of the farmer is turned to the improvement of his mowing and pasture lands. He seeks to increase the quantity, improve the quality, and economize in securing it. Until recently the grass was all cut by hand labor, tended by hand labor, raked by hand labor and handled by hand labor, which involved an amount of hard work which was really objectionable, and at a season of the year when the heat of summer invited to the cooling shade and less active exertions.

The introduction of machinery and horse instead of man power has greatly reduced the labor of man. The mowing-machine, the tedder, the rake and fork, all of which are operated by horse-power, decreasing manual labor, and rendering the hay season a much more delightful part of the year. Then come the cows, from hillsides and valleys, inviting the dairyman with his pails, and a preparation in-doors for the reception of the milk, and its manufacture into butter or cheese. This formerly was attended with great care and almost constant labor; and sometimes, while bending over the cheese-tub, the remarks would escape the lips of the dairywoman: "Too much hard work about cheese-making."

But within a few years this difficulty has been obviated. Cheese-factories have arisen in various sections, where machinery is brought into use, and where the art of cheese-making is brought to a greater degree of perfection. Here is economy of labor with larger profits. Here one individual will take care of the milk and cheese of one hundred cows with as much ease as twenty or twenty-five by the old process; so that we not only avoid a great amount of labor, but increase the productiveness of the dairy. In 1850 or 1851 the first cheese-factory in the State of New York went into operation, and now there are not less than eight hundred in successful operation, and the number is rapidly increasing.

In Massachusetts, the first factory was erected in 1864, and now there are not less than twenty. With this increase, and the increased attention given to this part of the farm operations, there can be no doubt but the march will be onward. With obstacles like these removed, many of the great barriers in the way of successful farming are broken down. And if the farmer will only realize that he is engaged in a noble calling, and not feel, as some do, dissatisfied with their business, and with longing eyes follow some one who perchance has left the farm for the workshop, the manufactory, the counting-room, the professions or political life, feeling that they are on the high road to fame, ease, wealth and happiness—that their path is strewn with flowers and roses, without a thorn, it will be well.

Let us remember that

> "The cares of State are thorns within the breast,
> That ever pierce the good man's heart and rob him of his rest."

Let him remember that the man of business is burdened with care and anxiety as he goes up and down upon the wave of prosperity and adversity, and that the tendency of such cares is to harden the heart and soften the brain. Let him remember that the professional man or politician is liable to be swayed by the opinions of others—by those on whom he is perhaps dependent for his daily bread—that he cannot or does not always stand up and proclaim the honest convictions of his heart, lest he may in some way block the way to his own individual success.

We live in a fast age, at a time when many wish to take the fastest train, and can hardly wait for wood or water, or to see whether there are obstructions upon the track that need to be removed. In this way perhaps an axletree is heated, a wheel broken, or some obstruction throws the train from the track, and destruction follows. If any one would become rich in this way, let him remember there is danger. If any one would get a fortune at one grand stroke, he will never take to the farm, for there are no grand strides like these in agriculture, but a steady onward progress, step by step.

When wealth is accumulated more slowly but steadily, we better appreciate its value, realize more fully what it is worth, and are more judicious in its use. Farmers are a more economical class. From their habits of life they are less liable to be drawn aside from their regular business to engage, perhaps, in some wild scheme for the accumulation of large fortunes, which schemes oftener fail than succeed. This mode of operation often unfits a man for the regular business of life ; draws him farther and farther from the slower but sure process of accumulation ; he involves himself with debts which he hoped the smiles of fortune would enable him to meet, but which reason did not sanction ; and finally, when he can be borne upon the high wave of fortune no longer, commits some desperate act, and sinks to infamy and shame. Such cases, with the business world, are not uncommon ; but with the farming community they are rare.

There is also something that is continually leading the mind to thought and reflection. No pursuit seems to be fraught with so much that is instructive. The great volume of the book of nature is constantly open before him, and he can draw instruction from every tree, shrub, plant and flower, and, while admiring the beauties of nature, be led through them up to nature's God.

The farmer increases the wealth of the world, which must come from earth or ocean. If he, by his exertions, causes the earth to bring forth more plentifully, he adds to its wealth and confers a blessing on society. The speculator may suddenly get large sums of money into his possession, but he has made nothing, added nothing to the wealth of the world. What he has gained, others have lost. The wealth, if it could be traced, would be found to be the result of accumulated labor. I do not mean to say that the different branches are not needed. All should occupy their appropriate place, to keep the whole machinery of legitimate business in active operation. But if we would do anything to quicken one branch more than another, let it be the farmer; for in so doing we confer the greatest blessing on the whole.

Many a man now engaged in the counting-room, workshop or the various professions intends some time to own a farm and enjoy the luxury of partaking of the fruits of his own labor, fresh from the field or garden, and pluck the luscious fruits from his own vine, feeling that he will then be free from the cares and perplexities of business in the cities or larger towns, and that he will breathe a purer and fresher atmosphere on some hillside or vale.

Were we to take the various vocations separately, aad compare them with the cultivation of the soil, we should occupy too much time and weary your patience. Suffice it to say, that with most branches of business, when labor ceases, the whole machinery is motionless. If the steam is not applied, nothing moves. If the main wheel ceases its revolutions, all the spindles are quiet. Not so with the farmer. In his sleeping as well as his waking hours, in rain as well as sunshine, in his leisure as well as his more active hours of labor, everything moves on until it is perfected for his own use or for the market. While the cow is cropping the tender herbage, reposing in the cool shade, or in the more quiet hours of night, the manufacture of milk or beef goes on. The swine, also, (if well fed,) is constantly taking on fat in preparation for family use or the butcher; and when the summer has completed its round, and the fruits of the farm are gathered and made secure, and the earth again puts on its robe of white, no class in the community has more hours for reading, thought, reflection and the improvement of those powers and faculties God has given them.

It is at this season the thrifty farmer reviews the operations of the past year, examines his accounts, ascertains what has been his success in the various departments of the farm, plans for the next year's campaign, sees what repairs are needed, and makes preparation for them. He also decides what additions are needed to his stock, or whether changes are necessary, or whether they would probably be advantageous to him, decides what fencing will be necessary, or other improvements on the farm or on or about the farm buildings. And when his plans are once matured, he makes all necessary preparation to carry the same into effect, so that when spring comes he may be better prepared to carry out his full programme for the year.

And here let me say that I think one of the reasons why so many of the young men leave the farm, is that system is lacking in the farm operations. There is too much pressing, at times, for want of preparation when there is more leisure, and there is too little done to beautify and adorn the surroundings of the farm and farm buildings. Let this be done, and everything be made as pleasant and inviting as possible, and the propelling force will many times be more than balanced by the attractions of home and its surroundings; and the young man, instead of being found behind a counter in some of our large cities, will be guiding the plough or attending to some of the duties of the farm, healthful, happy and contented.

Newton S. Hubbard.

This Essay was also laid over under the rules; when the Board adjourned.

FIFTH DAY.

The Board met at 10 o'clock, A. M., Mr. Hyde, of the Berkshire Society, in the chair.

Mr. Moore was appointed a Committee on Credentials.

The report upon the Barnstable Society, as also that upon the Worcester South-East, was presented by Mr. Hyde.

The reports of delegates were then read by their titles, and accepted.

The report presented by Mr. Hubbard, upon Farming as an Occupation, and that of Dr. Durfee, on the Relation of Manufactures to Agriculture, were then read a second time by their titles, and accepted.

The following Report was presented, upon

THE BEST METHOD OF FEEDING DAIRY STOCK.

BY JAMES THOMPSON.

The Committee, to whom was referred the subject of the best method of feeding dairy stock, report that they have attended to the matter, and submit the following:—

Farmers of Massachusetts and New England, generally owning and living on what can be called small farms, must depend on the manufacturing towns and cities in which to market their products. This interchange of commodities between the thrifty manufacturers and farmers should teach the latter that a thorough system should be adopted in their arrangements to make it profitable, as well as in the former. But still, with all these opportunities before them to gain knowledge and apply it immediately to their business, they will be more likely, if they can save a hundred dollars from the feed of their dairy stock, to invest in one of these manufactories, where they will get but eight to ten per cent.; which money, if applied to their own farms, by improving dairy stock, or in the barn arrangements, for facilitating what are called the barn chores, or in purchasing grass seeds or manure, by which two tons of hay could be made to grow where but one now grows, it would return them a much larger percentage, besides the pleasure and satisfaction that their barns, stock and farms were becoming more valuable under this improved management.

If the manufacturer should neglect to improve and look well to his investments, where he has to compete with others that are alive and moving with or ahead of the tide of events that surrounds us in all directions, he would soon be left in the rear, and his business would grow poorer and poorer, till he would exclaim, as the farmers are apt to, "that it does not pay."

But as this article is to lay out the best method of feeding dairy stock, we will take up the matter in the best form we can; but when a subject has been handled so well and by such able writers as have preceded us, it is difficult to represent it in a new light.

But let us take the best end first, and afterwards see what can be made of the poorer sorts of material that may be lying around to waste, where we have not enough nor any way of getting the better sorts.

We will start on the ground that good upland English hay is best if but one sort of food is to be continued through the winter. Such hay, grown on land seeded as it should be, with many sorts of grass seeds, and those that will mature or bloom as near one time as possible; such land as would return two and a half tons to the acre, and this grass cut in the bloom and not over-dried in making, and put into the barn in such quantities as will fill up an ordinary mow not less than ten feet at one putting in, then covered over with straw or old hay to the depth of a foot or more; and if not enough to fill up this space at once, better let it remain in cock on the field till you have the desired quantity. Hay thus made will not require cutting, steaming or sprinkling to induce cows to eat it; and its nutritive qualities, all are aware, are very much more than any other sort of fodder.

But as we do not wish to be understood that all hay is better than a variety of food, we will offer the following in comparison: If we have ten cows of 800 pounds each, it makes 8,000 pounds. Now the estimate being three per cent. live weight, 180 days each daily in good hay or its equivalent, to keep up their system when not in milk, is 43,200 pounds. Supposing they are in good flow of milk, it will require to keep up this flow and meet the wear and tear through the winter season, one per cent. more to be added, or 14,400 pounds. Thus it will need about twelve acres of the best upland to furnish this amount, if all hay, worth about $450. Now of this twelve acres we take one acre for roots; and, if properly planted and cultivated, will give 48,000 pounds, at twenty cents per bushel, (a small price,) is $160; the hay on the other eleven acres is 27½ tons, $412; total, $572. We will sell the surplus of roots and hay to find the balance between all hay, or roots, grain and hay, required to supply the one per cent. for the eight tons taken from the thirty tons on the whole twelve acres, leaving off fractions. We shall need 17½ tons roots, $117; 1½ tons of oil-meal or corn-meal, $90; or three tons fine feed is the same as above. Now 22 tons of hay, at $15, is $330; extra cost of growing roots over hay, $35; total, $572. By charging cows with the above, it leaves us six tons of hay to sell at $15, $90, and six and a half tons of roots, at twenty cents per bushel, $43; extra value of manure, at ten per cent., is $27; one quart of milk extra from each cow, 60 cents per day, $108; total, $268. The time above is based on 180 days.

Now take the credit from the debit, it leaves a debit of $304. Having credited the twelve acres, as before seen, for hay, $450, we must take what it has cost over the credit, as just shown, and we have a balance in favor of the variety of food, over all hay, $146.

We have given the above as estimates, but we will now give facts instead.

James Thompson, of Nantucket, has handed us the results of five thoroughbred Jersey cows for the year 1868 and one week last past in this year. Their ages are three 5 years old, one 8 years, and one 13 years. The one that is thirteen years has been farrow, calved November, 1867, and is to come in June, 1869. Their food, from January to May, was hay grown over peat and land adjoining those meadows, fed at the rate of twenty-five pounds in four feeds daily; or hay would be omitted at noon, and stalks, husks and other rough fodder substituted at morning feed. They had one quart corn-meal and one of fine feed slightly wet. At night had one peck of roots, (carrots till middle of January, then mangolds,) with one quart fine feed sprinkled over them dry. On this variety of food they come out to pasture. I say out, as we keep them in the barn nearly all the time from December to April, except to water, which is from a living spring one hundred feet from the barn. If the weather be cold, or the thermometer below 30° or freezing point, they are watered in the barn. The time of feeding is about 5 o'clock, A. M., when, being milked and having their grain, induces a quiet disposition; at 7 to 8 o'clock fed with hay. After eating it they are watered and allowed out till noon if weather as before stated. At noon a feed of hay. About 4 o'clock, P. M., if good weather, watered out or in the barn. At night their roots while being milked, after which they are fed the best hay we have for the night. The time of milking is 5 o'clock, A. M., all through the year, and about 5, P. M., in winter and 6 in summer. The first of April we give them liberty to go on the grass lands till it is time to pasture; thus their stomachs become somewhat prepared to take the green feed about the first of May.

The product of these five cows has been 1,350 pounds of excellent butter. The average of this to each cow is about 270 pounds. They are always dried off one month before their time of next calves is out.

Having quite a quantity of corn-fodder and poor hay, caused by the overwet season last past, I was induced to put in one of Prindle's boilers, which cost, all complete, about $65. As some others may wish to put one in, I will state how mine is arranged, as it comes in with feeding dairy stock. The barn-cellar is seven and one-half feet high, and part is hog sleeping and feeding rooms, outside of which is the manure running under the cow-stalls, or nine feet within the range of the barn. All under the barn is paved with old brick and cemented ; thus the hogs, root-cellar and water, with the boiler, are all near together. The chimney is concrete tile inside of a brick casing, running from cellar to about ten feet above the roof, through the corner the hay-mow, making a fine ventilator around the heated pipe, if it can be heated. It requires about two hods of coal daily to run the boiler, by which we can have hot water in five minutes, with the flexible pipe in a pail of cold water. The roots are cooked beside the hog's trough, and in it if you wish. The hay is steamed up above, in front of the cows, in a tank that holds but ten bushels. I had this, and was not sure of liking the arrangement till tested ; but I now shall make one to hold about one hundred bushels. The poor hay, corn-fodder, straw, and all the hay that is left by the cows, is cut in one of Burdick's No. 3 cutters. When the tub is filled there is about one gallon water for each bushel hay, &c., put in, and over this is one quart meal or two of fine feed sifted to each bushel, when cover is shut down and steam let on, taking about six hours to cook it properly. By these arrangements one man can accomplish more in one hour than he could in two where everything is at different ends and parts of the barn. The saving in fodder is not all that can be credited to the boiler, as it heats the whole cellar and barn, which is a saving that cannot be estimated in comparison with the old plan, where manure or water would freeze from December to April most of the time. When the water in the boiler needs replenishing, it is best to take what is required in a bucket and insert the pipe and heat it before putting it in. This will prevent cooling down the steam as it would if cold when it is put in.

I will now give the result of one week last past with these same five cows. As age, duration in milk and time of calving has much influence on keep and product, which is apt to be left out of accounts, I have thought it best to put the whole facts before you. Their average weight is about 800 pounds ; their ages, one 13 years old, calved November, 1867, time out in June, 1869 ; one 8 years, calved August, 1868, time out June, 1869 ;

one calved April, 1868, time out March, 1869; one calved November, 1867, and again January, 1869, time out next calving, October, 1869; one calved July, 1868, time, August, 1869. The butter made from them in the last week is thirty pounds. You will see that they have much passed their best flow, and one is within two months of next calving, and one has been one month in full flow, but not equal to what she would have been in June. Their food has been one bushel, six pounds corn stover, poor hay, &c., as before has been stated, with one quart meal, all steamed together, in the morning; at 7 or 8 o'clock, hay, five pounds; then watered in stalls; at noon six pounds straw or rowen, to vary the feed; at 4 o'clock watered in stalls; two quarts fine feed and one peck roots and hay, seven pounds, for the last feed. Their solid excrement has been 2,576 pounds, or 73¾ pounds daily from each, if the liquid or urine is equal or more valuable than the solid, and the whole saved on a cemented floor and absorbed by a plentiful supply of peat, seaweeds and mould, we have a large deposit, which is not a bad investment.

Prof. Dana fed to his cows, or one cow in seven days, water, 611 pounds; potatoes, 87 pounds; hay, 167 pounds. The average solid excrement daily in nine and a half years, fifty cows, kept up the year round, was 56 pounds each. He says that well-cured hay and grain give one-half their weight in solid and liquid, and potatoes, roots and green grass return one-tenth. His estimate is low for solid manure, but it may be accounted for as the cattle or cows being in milk, and not taking so much water as in other ways of care and feeding. Some statements are eighty pounds and over of solid dung from each cow, which led me to ascertain for my own satisfaction.

As the dairy cows on a farm are the machines through which is run much of the produce raised, and from which most of the profit is derived, it behooves us to make much of every sort of fodder that we can grow; and as very many farms have not the desired amount of upland to grow all good English hay, we cannot too strongly urge all farmers to raise roots that keep horses, cows, sheep and hogs. In fact, all farm stock devour them when properly prepared to suit each. Roots and cabbage are like barn manure, when compared with concentrated fertilizers by their bulk, as to the nutritive and fertilizing value of each; but when they are used in practise we all know the results are ahead of the estimate. Store hogs can be fed with turnips and mangolds from early winter to late spring, when other green provender can be grown till time to fat them; and they increase the manure heap wonderfully. This word manure ought to be the first and last thing looked after, as it is the source of all good farming.

There should not be over half a bushel of roots daily to each cow; and if you have no grain to give with them, better sell enough to buy a little, as one pint a day will check any tendency to scours. It should be understood that too much of a good thing is as bad as not enough.

Dairy stock fed in the manner as above will come out in the spring in such condition as to be able to go right to work in the pastures with a vigorous and healthy system, and produce a much greater quantity of milk than those which are fed on dry and rough food all winter, and turned out into a bleak lot even when the thermometer is below zero in some instances. I have seen some this season all four feet in the space of a foot. Why can we not all see that a cow well wintered is half summered?

Pastures should be somewhat rolling in surface, and covered with a sufficient quantity of different sorts of grass that will furnish them all the season; but it is safest for everybody to plant a piece of sweet corn, off of which they can gather for family use enough, and that matures before all is cut for fodder. This will help out the pastures in the heat of July and August, till the sweet fall feed springs up again; for pastures fed very short at this season do not recover again before the next year. The more extensive the pastures, provided they are not too rough and dry, the better; and allow the whole extent for their free use, where water can be had clear and cool as possible. If the surface be too rough and rocky, preventing improvement by other cultivation, then apply plaster or guano, in such quantities as you can afford, and it should be afforded if to be kept in a state to fully supply the cows; while in them the amount left by the cattle cannot be enough to return equal to what they have taken off, as they are generally yarded during the night, (or kept in the barn is best,) and thus save all the voidings where it will make the most manure.

We shall not recommend soiling instead of pasturing, unless it be under circumstances where the milk and butter can find a sure market at high prices; then it may pay, where but a few cows are kept, and no pasture can be had, as no other mode of feeding dairy stock can be compared to a good and extensive pasture, where they can have perfect liberty to select such feed, and shelter from winds, rains and the hot sun of midday; and if there be no natural shade by trees or bluffs, then sheds or high, tight board fences should be erected, in such situations as will allow them to select either side from wind or storm; and if these fences were covered on top, projecting both sides, they would be all the better. Such arrangements will cost but a small sum, and most of it will be in labor that is on hand, and such care and outlay will much increase the quality and yield.

JAMES THOMPSON.

This Report led to a long discussion, when it was laid on the table.

Voted, To appoint a Committee on Printing, with full powers to revise the reports. Messrs. King, Stone, Clement and the Secretary.

Adjourned.

SIXTH DAY.

The Board met at 10 o'clock, A. M.

Present: Messrs. Agassiz, Baker, Bassett, Bradford, Birnie, Blair, Boise, Brown, Clark, Clement, Cole, Davis, Durfee, Ellsworth, Fearing, Hubbard, Hyde, Johnson, King, Knowlton, Loring, Moore, Morton, Plunkett, Porter, Saltonstall, Slade, Stone, Thatcher, Thompson and Ward.

Mr. HUBBARD, of the Worcester South Society, in the chair.

Mr. Moore, for the Committee on Credentials, submitted the following Report:—

The Committee on Credentials have attended to the duty assigned them, and respectfully report the following as duly elected members of this Board:—

GEORGE B. LORING, elected by the Essex Society.
JOHN JOHNSON, Jr., elected by the Middlesex South.

Thomas W. Ward, elected by the Worcester.
John T. Ellsworth, elected by the Worcester West.
Lewis H. Bradford, elected by the Worcester North.
Geo. T. Plunkett, elected by the Highland.
Avery P. Slade, elected by the Bristol.
Charles G. Davis, elected by the Plymouth.
James Thompson, elected by the Nantucket.
James S. Blair, elected by the Hampden East.
James F. C. Hyde, appointed by the Executive.

Respectfully submitted.

John B. Moore.

In accordance with the report of the Committee on the Time of Holding Fairs, it was

Voted, That the fair of the Worcester North-West Society begin on the first Tuesday of October, that of the Union on the last Tuesday of September, and that of the Barnstable on the first Tuesday of October.

Subsequently, the fair of the Middlesex Society was changed so as to begin on the last Thursday of September.

The Committee appointed to consider and report upon the time and place of holding the fall meetings of the Board, submited a report, recommending that a meeting be held at the Agricultural College, at Amherst, on the 4th of August, and that the regular country meeting be held at Framingham on the 7th, 8th and 9th of December.

This report was accepted, but subsequently the place of holding the December meeting was reconsidered, and Pittsfield was substituted for Framingham.

Mr. Clark, chairman of the Committee appointed to select subjects and assign committees to investigate and report upon them, submitted the following :—

Breeding of Domestic Animals.—Messrs. Agassiz, Plunkett and Birnie.

Nature's Method of Distributing Plants.—Messrs. Clark, Wilder and Durfee.

Abortion in Cows.—Messrs. Pierce, Agassiz and Brown.

Use of Muck.—Messrs. Saltonstall, Fearing and Morton.

Preparation of Soil and Planting the Seed.—Messrs. Moore, Ellsworth and Bradford.

Climate as affected by Soil and Location.—Messrs. Hyde, Thompson and Baker.

Time of Cutting and Mode of Curing Hay.—Messrs. Johnson, Cole and Blair.

Road Building and Repairing.—Messrs. Davis, Hubbard and Boise.

Bedding for Stable Use.—Messrs. Birnie, Bassett and Ward.

Breeding and Training of Horses.—Messrs. Porter, Moore and Johnson.

The Potato Crop.—Messrs. Cole, Bradford and Thompson.

The Culture and Preservation of Fruit.—Messrs. Wilder, Clement and Moore.

The Use of Clover as a Fertilizer.—Messrs. Thatcher, Hubbard and Loring.

Economy of Farm Management.—Messrs. Loring, Slade and Stone.

The Value and Uses of Salt on the Farm.—Messrs. King, Knowlton and Cole.

Methods of Draining.—Messrs. Plunkett, Slade and Loring.

The Damages and the Good done by Birds.—Messrs. Clark, Saltonstall and Moore.

This Report was adopted.

The Report of the Committee on the Plan of a Barn, submitted to the Board at the meeting at Amherst, was then taken up and considered at length.

It being difficult, in the diversity of opinions, to decide upon the details of a plan to be recommended to the trustees of the Agricultural College, and which should serve as a model for general adoption, Mr. Davis submitted the following propositions as expressive of the sense of the Board :—

1. A barn should be so constructed in the climate of New England as to cover as much as is possible under one roof, provided it can be done without great inconvenience in any important particular.

2. It therefore follows that if two, three or more stories can conveniently furnish accommodations, it is cheaper and

better to so erect the barn than to spread the structure over much ground.

3. That for these reasons it is better to have a half basement for cattle when a slight declivity can be obtained; provided, always, that it should be so constructed as to be entirely above ground on one side at least, and high enough to be lighted on the upper side. Such a basement should be well ventilated, light and dry, and so constructed that it may be light and warm in winter and darkened and cool in summer, and have the advantage of separating the hay from the breath of cattle and odor of manure. If a side-hill location cannot be obtained, a barn as nearly like in the principles above indicated as can be erected is to be preferred.

4. That a plain parallelogram in form, with as few additions, wings and out-houses as possible, is what should be sought in the original plan. That a barn of this form, erected on the general plan heretofore indicated, may be best used as a model for all farmers, as it needs, as a general rule, to be only larger or smaller to meet the wants of all farmers.

5. That the details in the internal arrangement of a barn must be left to the wants and peculiar needs of each individual.

6. In all cases we would recommend a cellar for manure.

The propositions, after an elaborate discussion, were adopted; when, on motion of Dr. Loring, the whole subject was laid upon the table.

The Board then proceeded to the assignment of delegates to attend the county agricultural society fairs, as follows. To the

Essex,	Marshall P. Wilder.
Middlesex,	George B. Loring.
Middlesex North,	E. W. Boise.
Middlesex South,	Nathan Durfee.
Worcester,	Asa Clement.
Worcester West,	James Thompson.
Worcester North,	William Birnie.
Worcester North-West,	Eliphalet Stone.
Worcester South,	John A. Morton.
Worcester South-East,	John T. Ellsworth.
Hampshire, Franklin and Hampden,	George T. Plunkett.
Hampshire,	Lewis H. Bradford.
Highland,	H. S. Porter.

Hampden,	Charles G. Davis.
Hampden East,	Thomas W. Ward.
Union,	Charles C. Bassett.
Franklin,	Alexander Hyde.
Berkshire,	Imla K. Brown.
Housatonic,	Avery P. Slade.
Hoosac Valley,	George A. King.
Norfolk,	Albert Fearing.
Bristol,	T. D. Thatcher.
Bristol Central,	William Knowlton.
Plymouth,	John B. Moore.
Hingham,	John Johnson, Jr.
Marshfield,	James S. Blair.
Barnstable,	John L. Cole.
Nantucket,	Leverett Saltonstall.
Martha's Vineyard,	Newton S. Hubbard.

Mr. King then submitted a report as delegate to the Franklin Society, which was accepted.

The Essay of Mr. Thompson, on Feeding Dairy Stock, was then taken up, read a second time by its title, and accepted.

Mr. Hyde submitted the following Report on

THE POTATO CROP.

By the returns of the industry of Massachusetts for 1865 we find that potatoes rank third in money value among the agricultural products of this State, grass and corn only taking precedence. The number of bushels returned as the product of that year was 3,826,540, valued at $2,607,202. This includes only the potatoes raised in field culture. The amount raised in market gardens we have no means of estimating. The number of bushels of potatoes was nearly twice as great as the number of bushels of corn, but the cash value of the potatoes was estimated a little less. Considering the increased attention paid to the culture of potatoes since 1865, and adding the large amount raised in market gardens, we are safe in saying that this crop is now the second agricultural product of this State, and is destined to assume still higher importance.

Our climate and soil are well adapted to the production of this esculent, and the consumption is steadily on the increase. The crop has this great advantage to recommend it to the attention of Eastern farmers: that owing to its bulky nature, and the consequent cost of transportation, it does not come in competition with the products of the fertile prairies. In raising corn and wheat we may not be able to keep abreast with our Western friends, but in raising potatoes we have the advantage. It has been feared by some that our home production might glut the market, but the fact that the price has risen as steadily as the production has increased may well banish this fear. We well remember when the price of a bushel of potatoes ranged from a Yankee shilling to twenty-five cents; and when the price ran up to half-a-dollar it was feared that potatoes would be considered a luxury only to be afforded by the rich. Many looked for a substitute, and tried turnips and rice; but nothing was found to fill the place of this valued esculent. Now that the price in Massachusetts averages at the farmer's door seventy-five cents, and in the retail markets of the city over a dollar per bushel, the consumption is far greater than when the price was one-fourth of this sum.

By the United States census of 1860, the amount raised in the whole country was 110,571,201 bushels, of which 99,000,000, or nearly nine-tenths of the whole, were grown in the free States. Estimating the price at fifty cents per bushel, the proceeds from potatoes alone would have been, in round numbers, $55,000,000; and then this crop ranked fourth among the edible vegetable productions of the country, wheat, corn and oats being more valuable. At present prices, and with the present production, the estimate for the whole country must be over $100,000,000.

The potato was formerly used extensively in fattening stock; but the enhanced price since the potato disease first made its appearance, some twenty-five years since, forbids such disposal at the present time. If a farmer should now feed 100 to 150 bushels of potatoes,—for such was the allowance for fattening a yoke of oxen,—he would find it difficult to get his money back. The small potatoes may, however, still be fed to cattle with advantage.

As an article of diet, the potato compares better with bread than any other edible vegetable grown in temperate climates. Like bread, it is farinaceous, free from marked taste, and thus is adapted to all tastes, and is fitted to be cooked and eaten with almost every other variety of food. Some object to the potato because it is so tasteless, but the same objection would hold good against water. Turnips and onions certainly have more taste, but where one eats these vegetables five eat potatoes. It has become an indispensable luxury to the rich, and an equally indispensable necessity to the poor. How our fathers lived without it seems to us a mystery. Ignorance of its virtues must certainly have been bliss to them. We should be sorry to go back to those good old times. Its introduction as an article of food some three hundred years since was an era in human happiness and progress. Valuable as is the potato as an article of diet, its composition shows that it is intended as an accompaniment of meat, and not as a substitute for it, and this is the mode of using it adopted by all nations. The analysis of it gives 75 per cent. water and 25 per cent. dry nutritive matter. These proportions, however, vary with the different stages of ripeness and the different varieties. The more mature the potato the less is the quantity of water, and some of the richer varieties give as high as 32 per cent. of dry nutritive matter. The latter consists of starch 62 per cent., sugar and gum 15, protein compounds 9, fatty matter 1, cellular fibre 9, mineral matter 4. The dried potato is less nutritive, weight for weight, in the muscle-forming properties than any of the grains, except rice, which it much resembles in composition, having, however, one-half per cent. more gluten. It is remarkable that the Hindoo, who lives mainly on rice, and the Irishman, whose leading article of diet is the potato, have a physiological likeness, being distinguished by the size and prominence of their stomachs. This peculiarity is accounted for by the necessity of their eating a large bulk of food in order to be able to extract from it a sufficient amount of nourishment.

We cannot account for the great and increasing popularity of the potato, as an article of food among the civilized nations of the earth, from its nutritive properties, though these are not small. This universal popularity, which causes the potato to be found on the table of the humblest cottager and of the most aristocratic nobleman, must be attributed to its adaptedness to all tastes, all ages, all climates, and the various grades of health. A native of the highlands of a tropical climate, it grows everywhere, but loves best the cool climate of the hills, and is found nowhere in greater perfection than in New England, and we are confident is destined to become the second crop in value in the Eastern States.

The potato, greatly as we value it, was very slow in making its *debut* into good society, and its history is at once interesting and instructive. It was first brought to Europe in the middle of the sixteenth century by the Spaniards, under the name of *papas*; but made very little favor on its first introduction, and was considered as fit only for cattle. This may not be so strange when we consider that the Spaniards esteemed lightly for table use all vegetables, garlic and onions excepted. Sir Walter Raleigh carried potatoes to England in the latter part of the sixteenth century, but he little thought he was carrying the greatest contribution in the vegetable line America ever made to the Old World, corn alone excepted. Some may perhaps except tobacco also, but we make no such exception. Sir Walter planted them on his own estate near Cork, and thus unwittingly laid the foundation of Ireland's salvation from famine. They were soon carried over to England, but it was near half a century before they were much known at London. They were first raised in botanic gardens as an exotic curiosity, and when first used on the table were roasted and steeped in sack and sugar, or baked with marrow and spices, and even preserved and candied by the confectioners. In 1663 the Royal Society took some measures to encourage the raising of potatoes, with a view of making them an article of general diet and preventing famine; but they met with little success. The reputation of the potato was certainly "a plant of slow growth." In books of gardening published towards the close of the seventeenth century, a hundred years after the introduction of potatoes into England, they are spoken of slightingly. One author says, "They are much used in Ireland and America as bread, and may be propagated with advantage to poor people." Another says, "I do not hear that it hath yet been essayed whether they may not be propagated in great quantities as food for swine." Evelyn, writing in 1699 says, "Plant potatoes in your worst ground. Take them up in November for winter spending; there will enough remain for restocking the ground, though ever so exactly gathered." They seem to have been esteemed at the close of the seventeenth century very much as we esteem artichokes. In the "Complete Gardener," published in 1719 by the famous nurserymen, London and Wise, they were not deemed worthy of even a passing notice, and Bradly, another famous horticulturist, speaks of them as inferior to radishes. The ignorance and prejudice of our English fathers must have been great or they must have had a very inferior potato under cultivation.

Merit is, however, always sure of finding its way, sooner or later. In the case of potatoes it was certainly later, for it was not till the middle of the eighteenth century, two hundred years after their introduction, that they were generally known and cultivated throughout England. The Irish were keener witted, and enjoyed the comfort and profit of potatoes long before their neighbors across the channel appreciated them. Scotland began to raise potatoes on a small scale in gardens about 1740, and about twenty years after, the demand for them was so great that the Scotch farmers began to raise them in their fields. In 1796 about seventeen hundred acres of potatoes were planted in Essex County alone for the supply of the London market. The English were, however, slow to learn the best modes of cultivation, and for a long time a few of the tubers were removed from the ground in autumn and the balance left for seed, as Evelyn had recommended, covered with litter to save them from the winter's frost. In New England the potato has always been appreciated, and nowhere is it raised in so great perfection, and nowhere is it cooked in a greater variety of modes, and with greater skill,—so generally is it relished that it appears on the table every day in the year,—and no vegetable keeps so well from one season to another. Whenever meat is cooked potatoes are sure to be cooked with it, and a New Englander would find it a sorry thing to go back to the good old times of his Saxon ancestors, when they sat down to the table laden only with meats and black bread. We may talk about these good old times, but if we were put back to them we should find it all talk and no potato.

In the early days, or rather centuries, of potato cultivation, it was treated as a species having no varieties. For the introduction of varieties we are indebted to the market gardeners near Manchester, England. Encouraged by the demand, these gardeners vied with each other in securing the earliest and best varieties. They marked the plants that flowered early, saved them and sowed their seeds, and by again watching for the earliest of them they finally obtained varieties which were two months earlier than those they had been accustomed to cultivate. In the same manner, by selecting the seeds of the most farinaceous, the best flavored, best shaped and most productive, the quality and quantity were as greatly improved as the early maturity.

In this country we have, until recently, paid too little attention to this matter of variety. Some thirty years since we reckoned as surely upon a crop of potatoes as we now do upon a crop of beans. The potato disease was unknown; and, no matter what variety we planted, we expected a return of thirty or forty and sometimes sixty fold. True, there was a difference in quality then as now; but as long as all varieties were healthy, and the tuber was mainly used in feeding stock, we considered the variety as of minor importance. Many farmers planted the varieties indiscriminately in the same field and housed them in the same bin. This was ever a slovenly practice, a mixing of tares and wheat, which we fear some continue to this day. There is as much choice in the varieties of the potato as there is in the breeds of cattle. And, if we wish to attain any excellence or profit as cultivators, we must exercise the skill and discrimination of the stock-breeders. Some are hardy, others delicate; some ripen early, others late; some are well flavored, others unpalatable; some prolific, others unproductive; some well formed, others ugly; some farinaceous, others soggy. Now, if we plant healthy and diseased potatoes together, it is much like placing a robust child to sleep with an aged and infirm person. It is possible the vigor of youth may counteract the tendency to disease, which contact with the decay of age induces, but the chances are against it. Disease of every kind propagates itself. "One rotten egg corrupts the whole clutch," as the Irish saying is; and we all know how one rotten apple spreads decay through the whole barrel. So, in a hill or bin, one rotten potato is a prolific source of disease to all its companions; and if we plant healthy and delicate potatoes together, or house them together, we show either ignorance of the law of catalysis or gross carelessness.

Breeders have laid down the most prominent points of a good animal, by which they are governed in awarding premiums and selecting stock, with as much faith as a Churchman has in the thirty-nine articles of his creed ; and we propose to name a few characteristics of a good potato. In the first place, it should be healthy. As a good constitution is the first requisite of a good animal, so vigor is the leading quality of a potato. No other quality and no combination of qualities will compensate for the want of this. We have never seen a potato that, for table use, came up to the Carter ; but still few venture to plant this variety, as its constitution is so impaired, either by age or abuse, that it cannot resist disease except under the most favorable circumstances. Planted on a fresh sod of an old dry pasture, and in a dry summer, it may make a good return ; and some are so fond of this favorite that they continue to plant it, knowing that they run more than an even chance of losing their labor. The same objection, though in an inferior degree, lies against the Mercer, and indeed against many of the otherwise excellent table potatoes. We remember once hearing a cautious old bachelor say, that in selecting a wife he should consider health as the prime quality. We were inclined to smile at his placing the physical above the mental and moral in a wife ; but, as a potato has no mental nor moral quality, we shall certainly place health as first among the characteristics of a good variety.

Next to health we rank good flavor. Some may sneer at the idea of flavor in a potato ; but every variety has a taste peculiar to itself, as marked as is the flavor of the different varieties of apples. That potato is most universally liked, which, like pure water, has little taste. Some varieties are bitter, like the waters of Marah ; and it is a little singular that those who are addicted to the use of strong potatoes prefer them to the milder kinds ; much as those who are accustomed to drink the muddy water of the Missouri complain of the pure spring water of New England as having no body to it. There is no accounting for tastes ; but there can be no doubt that an unvitiated taste prefers a mild potato as it does pure water. The flavor depends partly upon the soil where the potato is grown and the material with which the soil is enriched. We have known the same variety, grown in sandy loam, lightened with muck or leaf mould, mild and agreeable, while grown in clay, enriched by fresh manure, it became strong and even bitter. The Carter is the standard potato for a mild, pleasant flavor ; the Jackson White, a seedling from the Carter, is flavored much like its parent; and the Early Goodrich commends itself, in this particular, to universal favor.

Another characteristic of a good potato is its farinaceous quality. Possibly we might become accustomed to a soggy potato so as to prefer it to a mealy one, but it will be some years hence and after long and self-denying practice. Possibly the mealy quality can be carried to excess, so that the potato will fall to pieces in boiling, and will not have consistency enough to be chopped up or broiled or fried in a second cooking. We have heard this objection made to the Dover. The first edition of it is good—light as a sponge cake; but it is almost impossible to warm it over and bring it on the table in a decent shape. As the first cooking is the more important one, and as the farinaceous quality is so desirable, there is little danger of cultivators paying too much attention to its development.

Form is another quality to which all potato-growers should have an eye. A deep-eyed, hunchbacked potato may taste just as well as a smooth, well-formed one; but there is great waste in cooking it, and the market value is and should be less. The Colebrook Seedling is a model in its form—a smooth, egg-shaped potato, with seldom an excrescence upon it. The State of Maine and the St. Helena are looked upon with great favor, as is many a belle, mainly for their good form. We may decry good looks, either in women or potatoes, as much as we please, still the stubborn truth will remain, that good looks first attract the eye and find a market.

Productiveness is a recommendation to the character of a potato so obvious that it needs only to be alluded to. This quality does not originate solely with the soil, as some imagine, any more than does the fattening propensity of a pig consist solely in the swill-pail. The productiveness of an animal runs much in the breed, and it is much the same in the vegetable. Some varieties of potatoes yield abundantly where others would sparingly. In the monthly report of the Agricultural Commissioner for December last, we find a table exhibiting the yield of the several varieties of potatoes grown upon the grounds of the department the past season, from which we learn that the greatest produce at Washington, as determined by one summer's trial, is the Albert, yielding $47\frac{3}{20}$ pounds for one pound planted.

The next in rank is the Economist, yielding $43\frac{10}{22}$ pounds for one. The Early yielded 39 pounds, and the Harrison $32\frac{13}{15}$ pounds. The trial of one summer is not sufficient to determine accurately this question of productiveness; for, unaccountable as it may seem, one variety does well one season and fails the next, while precisely the reverse may be true of another variety. The Early Goodrich did not do itself justice the past summer, while the Colebrook Seedling, that failed the previous summer, has redeemed its character the present season. With us the greatest producers for a succession of summers are the Garnet Chili, the Harrison and the Gleason, and these varieties have also the great merit of uniform size. The Early Goodrich has been a great producer, but, like the Northern Spy apple, while there are many large and good, there are also many small.

Other things being equal, we should give preference to an early and white potato over the late and red. The early potato is most likely to escape disease and frost, and comes into market when prices are high. Almost every season we hear some old fogy farmers, who have never heard of any other early potato than the Early June, say, in July: "We do not like early potatoes; they are soggy. We prefer old potatoes till the new ones are ripe." This means they prefer the old withered potatoes, with the starch dried out of them, to Early Junes or Round Pink Eyes. To cure all such prejudices needs only a few doses of Sebec or Early Goodrich taken at dinner time. One dose will generally suffice, but a week's application is warranted to cure. A dose of the Early Rose would perhaps be still more efficacious; but the Rose tastes too strong of silver to be used as a medicine. Dr. Holland, of the "Springfield Republican," is the only man we know who has had much experience in eating the Rose potato, and he commends them highly; and well he may, for in eating two or three barrels he unwittingly ate what would have sold for as many hundred dollars. Editors are expected to know everything, and we hardly know how to excuse the doctor for his ignorance of the market price of the Rose potato. Possibly he was writing his "Katrina" while the potatoes were being consumed, and the editor was lost in the poet. If the Rose contributed to his inspiration the world gained by his loss of the potatoes.

The prejudice against red potatoes may be a mere prejudice, but it exists, and we must make the best of it, and get around it if we cannot overcome it. We know no reason why red potatoes should not be as good as white ones; neither do we know any reason why a red man may not be as good as a white man; but we all prefer to be white, and we all prefer white potatoes.

Avoid a deep-eyed potato. There is great waste in buying them, as we buy much air if we buy by the bushel. This may not be an objection to the producer, but we take it for granted all farmers are honest and wish to give a fair equivalent for value received. If potatoes were sold by weight, as they should be, this objection would be obviated; but still there would be great waste in cooking the deep-eyed tubers. Still some of the deep-eyed potatoes are so good that we can afford to pocket these losses. The Garnet Chili is imperfect in this particular, but is too good a producer, and too healthy and well flavored, to be discarded for this one defect. Moreover, it is the father of the Rose, one of the latest wonders in the potato world. As we can buy a bushel of Garnets as cheaply as one pound of the Rose, we prefer for table use the old block to the young chip; though we have no doubt the Rose will prove a great accession to the varieties of potatoes, especially as it matures a week or ten days earlier than the Early Goodrich.

We should not do this subject of the varieties of potatoes justice did we not pay a tribute to the memory of the late Rev. Chauncey E. Goodrich, of Utica, N. Y., who devoted more time and showed more zeal and skill than any other man in propagating the potato. For sixteen years he studied this subject most carefully, and he has left us a rich legacy in the results of his investigations. From some constitutional idiosyncrasy, Mr. Goodrich was unable to eat potatoes himself, which fact makes his persevering labors in studying the habits of the plant and originating new varieties all the more praiseworthy. As early as 1846 his attention was called to the potato disease. The result of his investigations was the conclusion that the causes of the disease were want of vigor in the constitution of the plant, the artificial mode of propagation by cuttings instead of the natural mode by seeds, the sudden changes and the intensities of our climate and the character of the soil.

The constitution of the potato, he concluded, had thus become impaired, and the product of one year transmitted its want of vigor to the next generation, each becoming more and more enfeebled. In 1848 he imported from South America, the original home of the potato, some of the native tubers, and from the seed of these began producing new varieties. In all, he originated some fifteen thousand seedlings. These he divided into seventy-four distinct families. After four or five years' trial of the different seedlings, he rejected those whose health, yield and habits he did not like. Mr. Goodrich died in the midst of his experiments, but not until he had established in public favor the Garnet Chili, Early Goodrich, Cuzco, Calico, Gleason and Harrison varieties, which now stand at the head of the list with all well-posted cultivators. These varieties can be cultivated with the expectation that under ordinary circumstances they will escape disease and yield remunerative crops of excellent quality. They will probably degenerate in the course of time, and a reproduction from seed of healthy parentage is the only mode of propagating the potato with the certainty of reproducing a healthy variety. The Early Goodrich has not done as well the past season in some localities as formerly, but we have never yet seen a rotten potato of this variety.

To insure the success of the Early Goodrich, and indeed of all the early varieties, planting must be done early in the season. So far as we can learn, those who have failed of producing good crops of this variety have planted late. Early planting produces a greater amount of woody fibre and less of soft cellular tissue in the vines, as it grows more slowly in the cool weather. As a general rule, the early planted crops of all the varieties are more hardy than those planted late. The maturity of the crop is driven by late planting into extreme autumn and unfavorable weather, even should it escape the dangers of the hot, sultry days and cool nights of August. It sometimes happens that extreme warm weather, with sudden changes, occurs in June, when the vines of the early varieties are in their most succulent state and the tubers are approaching maturity. In this case they may become diseased, while the late planted, not much developed, escape and yield a healthful and bountiful crop. This is, however, the exception, and not the rule. We look for the weather that is most trying to the constitution of the potato when the dog-star rages, in the latter part of July and during August. The engorged state of the plant, and its soft vascular tissues, especially when grown in rich soil, render it liable to disease when the hot, moist days are succeeded by cool nights, or a sudden change of the weather checks the flow of sap. The cells may burst, from an excessive flow stimulated by heat, moisture and nitrogenous manure, or they may collapse by the sudden check of the sap by cold. In either case putrefaction ensues. If the potato has great constitutional vigor it may resist these changes. The Garnet Chili, the Harrison and Gleason seem to possess this vigor, and we trust the Rose has it also, but its character is not yet fully established. We have the past summer raised the Gleason on very rich garden soil, and while other varieties planted by their side rotted, the Gleasons came out sound and in great abundance. The potato loves a rich soil, and large crops can be raised in no other, and one great advantage in planting vigorous varieties is that we can plant them in such a soil. For many years after the disease made its appearance it was supposed that little, if any, nitrogeneous manure could be applied to the potato patch, as it so greatly enhanced the tendency to rot, and we were content to raise light crops on poor, light soil. The yield fell off from an average of three hundred bushels to the acre to less than one hundred. Since new and healthier varieties have been introduced the yield is again on the increase, partly because we find that these vigorous kinds can resist the tendency to disease which manure induces. The Garnet Chili, one of the earliest introduced by Mr. Goodrich, and one of the most vigorous, has evidently lost something of its original constitutional power, and in a hot, damp time decays when planted on fresh, unfermented manure.

The soil best adapted to the potato seems to be a sandy loam, well drained, in case the subsoil is of clay. Clay soils, if the season is unfavorable, are peculiarly prejudicial to the health of the potato, as they envelop the tuber closely and prevent the access of air, light and heat. If the surface of the unripe tuber is kept constantly wet, as it is apt to be in a wet season, on clay soil, decay will be likely to ensue, even when morbid matter has not been conveyed from the vine to the root, which seems to be the usual mode. The inverted sod of an old pasture is one of the best soils for potatoes. With a little well-rotted compost harrowed in thoroughly upon such a sod to give the plants a good start, we have raised good crops upon comparatively poor soil. An old pasture contains much vegetable matter, and the tubers delight in the mellow bed which such a soil affords, and come out in the fall clean and healthy. We have also raised good potatoes in a mucky soil apparently having little but vegetable matter in it. This can only be done in a dry season. In a wet summer the muck retains too much water, and has the same influence on the tubers as compact clay. Leached ashes should always be put in the hill with potatoes, when planted on muck, to furnish the inorganic matter in which muck is deficient. A compost made of muck and leached ashes is one of the best possible manures for the potato. The muck makes the soil porous, and furnishes a bed in which the potato delights as much as our mothers formerly did in a feather-bed. Sufficient potash is left in the leached ashes to furnish this essential ingredient of the potato.

Sandy soils are often as much too open to atmospheric influences as clay soils are closed against them. Sand both cools and heats too rapidly, and feels the sudden changes of temperature which are so trying to the potato. Still, on poor, sandy soils good crops of potatoes can be raised by the aid of muck and ashes. The perfect drainage and the slow growth secure this result. The seed should be planted deeply and cultivated on a level, so that the tubers may be less affected by the sudden changes of temperature. We have known potatoes to rot as badly on sand as on clay when planted superficially and hilled up in contracted hills. Hilling was formerly universally practised; but hills heat and cool more rapidly than a level surface, feel the effect of drought more, and are now discarded in light, dry soils. It was supposed that the tubers felt the influence of air more in the hills, and had a lighter bed in which to expand; but potatoes should not be planted anywhere till a good bed is first prepared for them. The only good reason for hilling in a dry soil is that the potatoes are more easily dug. Diseased tubers will generally be found nearest the surface of the ground, and if the soil is washed off so as to expose them to the sun and air they are ruined, if they do not rot.

Whatever may be the character of the soil, it should be ploughed deeply and thoroughly mellowed by the harrow. Deep ploughing, deep planting and frequent stirring of the soil with the cultivator will place the crop beyond the contingency of a wet or dry season. If the soil is thoroughly drained and pulverized, so as to be light and spongy, it will allow the excessive moisture of a wet season to pass through it, leaving its enriching qualities for the nourishment of the potatoes, and in a dry time will, like Gideon's fleece, absorb the vapor which always abounds in the atmosphere. The statement that a deep and mellow soil is best adapted to resist the extremes of moisture and drought may seem to some paradoxical, but facts abundantly verify it. In case the land is not thoroughly drained, and is of a clay nature, inclining to be wet, we prefer broad hills or drills to level culture, as the potatoes will be less exposed to excessive moisture. Drills will give the greatest return, and if the land is sloping should be made to run directly down the slope, so as to afford partial drainage. We have heard the fear expressed that if drills run with the descent of the ground the land would be liable to wash in heavy showers; but this is a mistake. With a furrow once in three feet there can be no great accumulation of water in any one furrow. The frequent furrows scatter the water, much as Quimby's frequent points on his lightning-rods scatter the electricity, whereas if the furrows run obliquely or transversely with the slope the water will accumulate in the furrow till it rises to a sufficient height to overcome the barrier of the drill, when it makes bad gullies, as the Yankees call the channel made by running water. If potatoes are planted in drills three feet apart, and the seed dropped at intervals of a foot, the cultivator can pretty much supersede the use of the hand hoe. This should be run between the drills as soon as the young shoots make their appearance, to keep the ground mellow and open to atmospheric influences. One hand-hoeing may be necessary to eradicate the weeds growing in too close proximity to the potatoes to be exterminated by the cultivator, otherwise we should never care to put a hoe among potatoes. By much waste of human vitality the hoe may be made to pulverize the soil as well as Share's cultivator; but we have never seen it done, and should decidedly object to putting our muscles to such a strain when those of a horse can be obtained, and the work be better accomplished in a tenth part of the time. When it is desired to throw the mellowed soil in ridges the side teeth of the cultivator can be taken out, when the long mould-boards of the cultivator will place the soil where it is needed. Nor should the cultivation be continued late in the season, for a new setting of tubers may be thus occasioned, which will be late and small, and will draw the nourishment from those set more early. In case the potatoes are planted early, and the land is rich, as it should be, the tops will completely cover the ground by the first of July, keeping it shaded and moist, and smothering the weeds that may be struggling to live.

The question, whether to plant large or small, cut or uncut tubers, has long been a mooted one. We are satisfied, both from our own observation and the testimony of others, that medium-sized tubers are better than large or small, and that they should always be cut lengthwise, leaving three or four eyes in each piece. We have raised good crops of potatoes from small tubers and small pieces with single eyes. The use of such seed for one year may produce no marked deterioration; but let this plan be continued for a series of years and degeneracy will surely follow. It will be found a penny wise and pound foolish policy. The use of the tuber is to furnish nourishment to the young shoot, and if a generous slice is planted the shoot comes up strong and healthy, with a broad leaf, and grows vigorously, overtopping the weeds. If a small piece or only a sprout is planted, it starts slowly and feebly and requires much nursing. When the seed of some rare variety costs a dollar per pound, the temptation is great to plant the sprouts only, and to plant successive sprouts from the same eye. This may answer as a temporary expedient for money-making, but is contrary to the laws of good seeding. We are confident the practice tends to the deterioration of the constitution of the potato. It is like stunting an animal in the early stages of its growth. Generous feeding afterwards may apparently compensate for the damage done by the previous parsimony, still the constitution of the animal has received a shock not easily remedied, and will be very apt to show it in the next generation. Certainly if the process of half-starving the young is continued for a succession of generations, we may expect a degenerate race of animals. We know there is some hazard in drawing analogies between vegetable and animal pathology, but the causes of disease, arising from poor nutrition, original want of constitutional vigor and the changes of the weather are much the same in vegetables and animals; and we are confident that one of the causes of degeneracy in the potato is the want of proper nourishment when only the sprouts or small pieces are planted. In these cases invariably the sprout is small, grows slowly at first, and the first leaves are small and shrivelled, and if the weather is unfavorable many of the sprouts die.

We knew an experiment of this sort made the past summer with the Rose potato, in which three successive generations of sprouts from the same eyes were planted, the first in April and the two succeeding in May, and finally the tuber itself was cut up and planted. The sprouts were feeble, and many of them died, but by good cultivation yielded bountifully over one hundred fold. The gain of one year will, however, be more than balanced by the loss of constitution in the potato. In fact, we fear the character of the Rose potato has already been injured by this excessive lust of gain, prompting to this injudicious mode of propagation. We know of some instances in which the Rose has rotted badly the past summer, whereas such a new and thoroughbred seedling, coming as it does directly from the Garnet Chili, one of the healthiest of Mr. Goodrich's varieties, and boasting of a descent from a Peruvian ancestry, should not rot under the most unfavorable circumstances.

The objection to planting whole potatoes is that we get too many stems growing together. It is like planting six or eight kernels of corn in one hill. There is not room for proper development of the seed. Such thick growth may answer for a forage crop, but when the object is seed or roots the ground must not be overstocked. Three or four stems in a hill are better than more.

As large potatoes will manifestly furnish more nourishment to the young shoot, it may be asked why not plant the largest and thus get a vigorous start. The objection to these large potatoes for seed is that their tendency is to reproduce large, overgrown, hollow-hearted tubers, of coarser texture and flavor than the medium sized. This was the objection to the Garnet Chili's on their first introduction. They were too large, often hollow, and not a first quality table potato till late in the spring. Subsequent cultivation from small tubers has greatly improved them in this respect, though at the expense of constitutional vigor. Such were the health and vigor of this variety on its first introduction into Massachusetts, some eight or ten years since, that we have seen some of the larger specimens of the previous year's growth cracking open in the cellar during the summer and exposing twelve to twenty young tubers, of the size of marbles, that had grown to this size, fed only by the air and the parent tuber. We have never seen a similar instance in any other variety. This may seem to some a fish story, but we are prepared to vouch for it.

The object in cutting the potato lengthwise is to secure the vitality of the seed-end and at the same time the nourishment of the butt-end. It has been observed that the eyes or buds at the seed-end start with more vigor than do the others, and hence some economical housewives have been in the habit of cutting off this end for seed while preparing potatoes for the table during the winter. The practice lies open to the same objection as the planting of sprouts. There is not sufficient nourishment furnished the young plant from the potato itself. In the eye-end there is concentrated more starch and more vitality, just as there is more sugar and more flavor in the bud-end of the apple than in the stem-end; but if we cut the potato crosswise we lose the support which the butt is designed to give to the eyes.

We have found it an excellent plan, when cutting potatoes for seed, to put them into a barrel and sprinkle upon them a quart or two of plaster. If the barrel is well shaken the plaster will fasten upon each fresh-cut surface, absorb the moisture and prevent the ingress of air, so that the seed will be less likely to rot after being planted, and the plaster will also aid in furnishing nourishment to the young plant.

We often hear it recommended to change the locality of the seed yearly; and seed brought from the North is generally thought to do better than that from the South; while others maintain that it makes no difference where the seed comes from, provided only that it be changed. We have no doubt there is such a thing as acclimating a vegetable as well as an animal. The climate, soil and seasons stamp themselves on the vegetation grown there; and we can readily see that a potato brought from the North will ripen in a given latitude at an earlier day than one brought from the South and accustomed to a longer period for maturing. Facts seem to favor this change of seed, and facts are stubborn things. The subject needs further investigation.

The time of digging must depend upon circumstances. If the crop is designed for winter and spring use, and the soil is dry, we should prefer to let the potatoes lie in the ground till the weather is cool enough to allow them to be immediately stored in the cellar. But if the soil is moist and the crop shows a tendency to rot, it should be dug as soon as mature, and placed on some dry knoll, scattering with every half dozen bushels a quart of fresh-slacked lime. Over the pile the potato vines may be thrown, and over the whole a few inches of dry soil in a conical form, making a pit much like the charcoal pit. The lime checks the tendency to rot, and we have never known potatoes thus treated to fail of keeping well. Some recommend charcoal dust instead of lime, and we presume it is useful, as it is an antiseptic ; but we cannot recommend it from personal experience. When the weather becomes cool the potatoes can be removed to the cellar or taken to market.

By all means dig in dry weather, and store the potatoes away as dry as possible, with but little exposure to the sun. The skin of the potato is of a corky nature, impervious to water, and designed to keep external moisture from the potato and the internal moisture from evaporation, and if too long exposed to wet will sometimes rot, when the tuber must perish. A well-ripened potato, put up dry in the fall, will lose little weight during the winter, its skin preventing evaporation as effectually as does the tight cork of a bottle. In the warm weather of summer the starch is converted into sugar and slowly evaporates through the pores of the skin.

All cutting and bruising of potatoes must be carefully avoided. They must be treated as things of life, and not like the stones which can be tossed about without sensation. Every cut and every bruise increases the tendency to decay. The potato may not be quite as sensitive as the apple, and may stand more hard thwacks; but still every bruise breaks the cellular tissue and puts the vitality of the tuber to a hard test. The digging must not be entrusted to careless boys, or the potatoes will look sadly hacked. We have never seen any instrument for digging that will compare with an Irishman's shovel. Making a fulcrum of his knee, the Irishman runs his shovel under a hill and lifts potatoes and dirt together, carefully picking out and placing the tubers in the rear, and scattering the soil about evenly, so that when the potatoes are harvested the field looks as though it was prepared for a crop of wheat. Such a mode of digging is almost as good for the land as a thorough spading.

Potatoes that are by constitution and culture healthy can be stored in large bins, provided the cellar is not too damp nor too warm. We are blessed with a dry cellar, situated on a gravel knoll, and have never known a potato put into the cellar in good condition to rot after it was stored away. The windows should, however, be left open as late in autumn as the frost will permit, and the temperature kept as near to the freezing point as possible without exposing the vegetables to freezing. Every cellar should also be furnished with a ventilator running to the roof of the house, so that should any of the potatoes rot the malaria may not poison the household. A simple hole in the chimney makes the best ventilation possible, as the hot air makes a strong draft, and the current will be found from the first floor into the cellar and thence up the chimney, provided there is a no more direct access to this great and best ventilator of the house.

In case the potatoes are wet by a sudden shower before being housed, or from any cause they are wet when put into the bin, it will always be safer to put a little air-slacked lime with them as they are stored away. A little dry dirt upon them does no damage, provided always it is sufficiently dry. A washed potato never keeps as well as one that is put directly from the ground into the cellar. Washing seems to remove a part of the integument which nature has provided to guard against the entrance of moisture and air to the flesh of the potato. We often hear thin-skinned potatoes praised, but they are apt to be of a delicate constitution, and consequently more liable to disease; so that as Virgil says of the farm, "Praise a large farm, but cultivate a small one," so we say, praise a thin-skinned potato, but plant those of a thick cuticle. As the potato is often kept six or eight months before finding a market, it needs a thick covering to protect its virtues from evaporating.

With all the care possible exercised in cultivating the potato the varieties seem to decline with age. None of the old standard varieties can now be relied upon with certainty. The Carter, the Mercer, the Peach Blow, may in a favorable season and circumstances yield a remunerative crop; but the chances in most parts of New England are against them. On the sandy soil of Cape Cod, where the climate is so much modified by the sea-breeze, with the ocean in close proximity on either side, we are told the potato disease is scarcely known. If so, the Cape can be put to no better use than growing potatoes. With muck or seaweed mixed with the sand, no better soil or climate can be desired for the growth of this esculent. But those of us who live in the interior, especially those who cultivate clay lands, must look for new and healthy varieties. Would that the mantle of Rev. Chauncey E. Goodrich might fall on some worthy successor, and that his investigations might be carried on with all the nice accuracy and close observation which he exercised. The loss from the potato disease in England has been estimated some years as high as fifty million dollars. In this country it has never been as great, but here it has caused serious alarm lest this most valuable esculent should be entirely lost from among our vegetable productions. This extreme anxiety has abated with further knowledge of the disease, and we feel confident that the potato, by more skillful culture, and especially by the introduction of more hardy varieties, is destined to continue one of the leading crops of the country. In order to this, more attention must be paid to originating new varieties from seed. No tyro can do this successfully. There is no such thing as a thorough-bred vegetable, as well as a thorough-bred animal, and the principles of vegetable physiology are nearly as intricate as those of the animal economy. The balls for seed must be taken from vines whose tubers are known to be hardy, well shaped, early ripened and largely productive, and with all care taken in the selection of seed the cultivator will find that the potato sports into many varieties, much like our common fruits. The seed must be sown in the spring in a hot-bed, and when the season is sufficiently advanced the plants can be transferred to the garden or field. In the autumn, the most promising varieties can be selected for further trial, and experience proves that the most hopeful at the end of one season prove worthless in the course of further experiment. It is only after four or five years' cultivation that the character of the new seedlings can be well ascertained; and when it is well established in the mind of the cultivator the public are slow to believe it, so that the reputation of a potato is a work of many years, unless, like the Rose, it falls into the hands of speculators who blazen its merits for the sake of gain. After the labor of cultivating many thousands of varieties, Mr. Goodrich found only ten or a dozen in all respects worthy of general cultivation. No highly valuable seedlings were produced from old and diseased varieties. In the Garnet Chili, Early Goodrich, Gleason, Harrison and Rose we have bases for still further improvement and every encouragement to hope for success. Mr. Goodrich has left us a rich legacy in these potatoes, and more particularly in the minute details of his experience, which he communicated to the public in the Transactions of the New York State Agricultural Society for 1863. We hope to see these experiments continued by some equally disinterested, indefatigable and skillful laborer in this department. Our Agricultural College can do the State no better service than by originating good, healthy and productive varieties of this esculent. With potatoes at one dollar per bushel, as they now are in the retail markets, they would be an expensive luxury did not custom make them an indispensable necessity. So far as mere nutrition is concerned, a poor man, at present prices, can much better afford to buy flour for his family than potatoes. If by the introduction of new and healthy varieties, and an improved mode of cultivation, the average yield per acre can be raised again to three hundred bushels, then the farmer can better afford to sell potatoes at fifty cents than he now can for one dollar. We commend this subject to the attention of the Board of Agriculture, to the trustees of the College, to the farming community generally, and to all who own a potato patch.

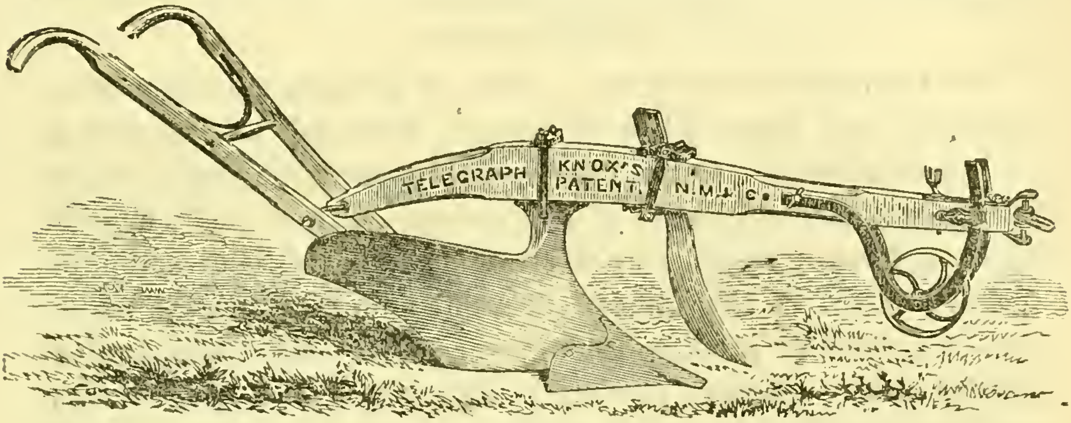
This Report was accepted.

The Committee on Meetings was constituted by the appointment of Messrs. Hyde, Clark, Thatcher, Plunkett, and the Secretary.

Voted, That all unfinished business be referred to the Committee on Printing, with full powers; when the Board adjourned.

TRIAL OF PLOUGHS.

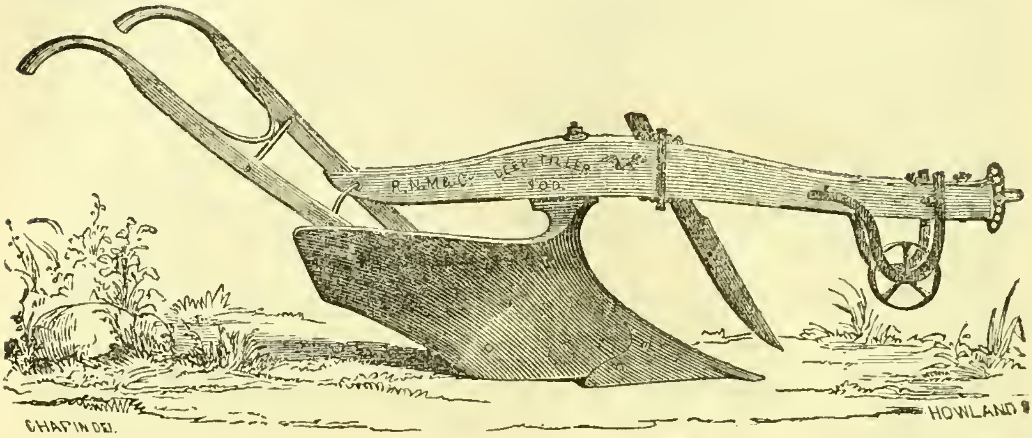
Among the incidents worthy of mention, in this connection, is the trial of ploughs which took place on the grounds of the Massachusetts Agricultural College at Amherst in May last, under the auspices of the New England Agricultural Society. The occasion excited very general interest among the manufacturers of that class of implements and among the farmers of that part of the State. Twenty-nine ploughs were entered for the trial, which lasted four days. The list of entries included nearly every variety of pattern, except the steam plough, now in use. No similar trial has called forth so much competition·



TELEGRAPH, No. 3.

The favorite Telegraph plough, made and entered by the Ames Plow Company of Boston, started off in class 3, and did such work as to secure the award of the medal by the committee. This plough has a wide range of adaptation. As a greensward plough it is claimed to be an improvement upon the Deep Tiller 73½, especially in the form of the standard and the mouldboard, and in securing the beam to the plough by a clasp instead of a bolt. The Telegraph No. 3 is a large implement designed for a three or four horse plough, and as such it is one of the best of its class. The No. 2 is a more recent construction of Mr. Knox, made on the same principles, but smaller and designed to be worked by a yoke of oxen or two horses. With these ploughs a furrow of 12 to 14 inches wide and 6 to 8 inches deep may be laid smooth and level.

The Deep Tiller was also entered by the same firm and did admirable work, receiving an award in its class. It turns a good furrow from 5 to 8 inches deep and from 11 to 14 inches wide with one yoke of oxen or a span of horses. With a stronger team it is easily worked much deeper and pulverizes the furrow slice satisfactorily.

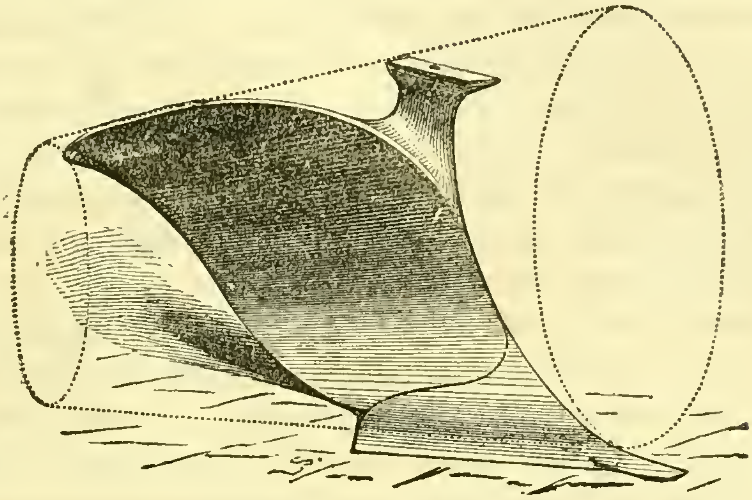


THE DEEP TILLER.

The Deep Tiller embraces a series of ploughs now manufactured by the Ames Plow Company, designed to embrace a variety of sizes and forms of the mouldboard adapted to every kind of soil and peculiarity of a varied agriculture. The mouldboard is formed by a series of straight lines in the direction of the movement of the furrow slice, but admits of all the variations required to produce a longer or shorter mouldboard, of a gentler or more abrupt curvature, with straight or more or less concave lines laterally as difference in soils or practices may require. The mouldboards have a combination of curved lines and planes having an equal bearing upon the furrow slice, and receiving an even polish upon their whole face, giving the furrow slice a complete and uniform twist in turning and leaving it in the desired position and in a mellow condition for the harrow. Both these ploughs did admirable work.

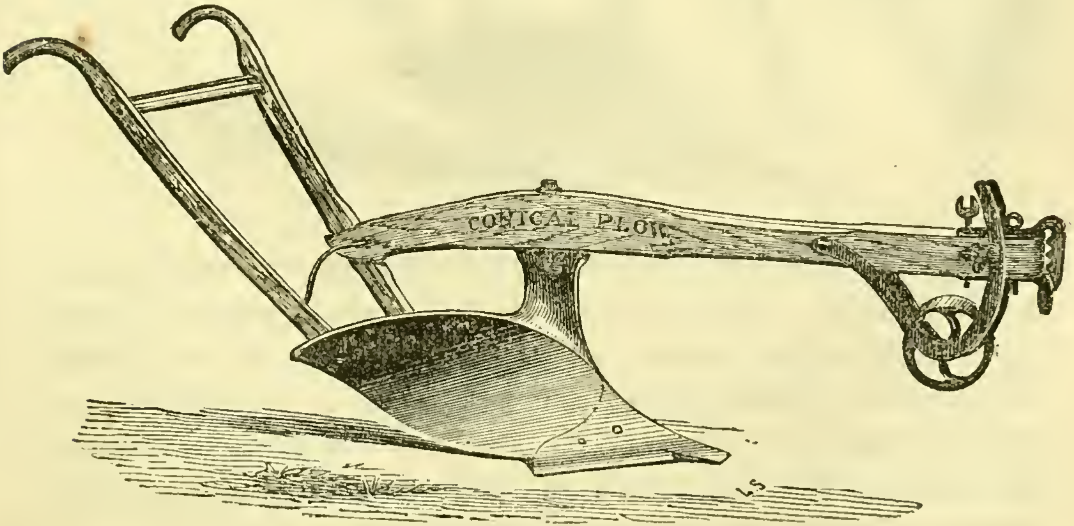
The "Conical Plough," invented and made by Solomon Mead, a practical ploughman, of New Haven, Connecticut, is another instance of the adaptation of the various parts of the plough to mathematical principles.

The mouldboard is made to fit the frustrum of a cone with the base or larger end forward. A block of wood, rounded off in the form of a cone, will fit closely to the surface of the mouldboard from the highest point to within about two inches of the cutting edge of the wing of the share. The angle of the share, for two or three inches of the cutting edges, is so slight that some inches of the furrow slice are completely separated before it rises much. This gives an easy separation of the furrow slice, since it rises slowly and gradually at first till it reaches a point higher up on the mouldboard, where a more abrupt curve hastens it over.



APPLICATION OF THE CONE.

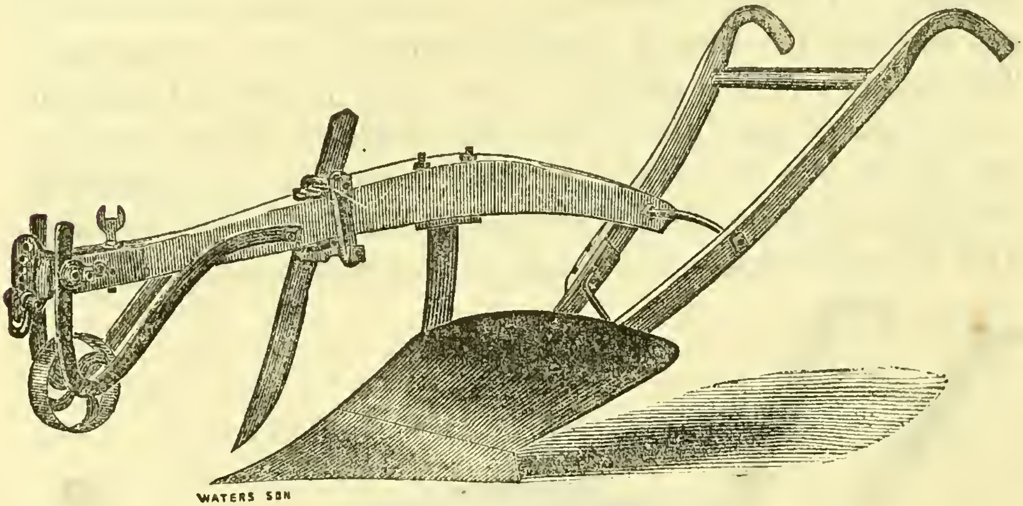
By this form of the mouldboard, the furrows are more thoroughly pulverized and crumbled up, than when the board is made to fit the straight surface of a cylinder. The surface of the board of the conical plough is neither concave nor convex in a horizontal plane, so that the friction between the board and the furrow slice is uniform, no greater in one place than another. It cleans, therefore, more readily than a concave board can do, and the wear is evenly distributed over the surface. The draught of this plough is easy, and in light and medium soils it leaves the surface even and mellow. Being short on the sole it is well adapted to stony land. It is remarkably evenly balanced, and in stubble land it scarcely requires holding. This shows the plough to be made on true mechanical principles.



MEAD'S CONICAL PLOUGH.

Many soils are so adhesive and difficult to work that the ordinary iron plough is inadequate. In a fine, sticky mould, like the black friable soils of the prairies of the West, none but steel ploughs can be used, for the reason that no others will "scour," or run clear. In some sections the soil seems like putty in its adhesive properties, while often a very fine quartz sand will rough up the polished surface of even a steel plough, if made of ordinary sheet or cast steel, and not high tempered or sufficiently hardened.

Sheet steel ploughs have, therefore, been in use on the prairies of Illinois and other adjoining States for the last forty years, having been introduced as a matter of necessity. The first steel plough was made there by John Lane, near Lockport, Illinois, the sheet being taken from saw-mill saws and welded together to get a sheet broad enough for a mouldboard. This plough scoured in the heavier prairie soils, and was a great and decided advance upon all iron and wooden mouldboards hitherto in use. Sheets of spring or blistered steel were afterwards rolled out, and thousands of ploughs were made from them, the plough makers forming them with the hammer on the anvil.

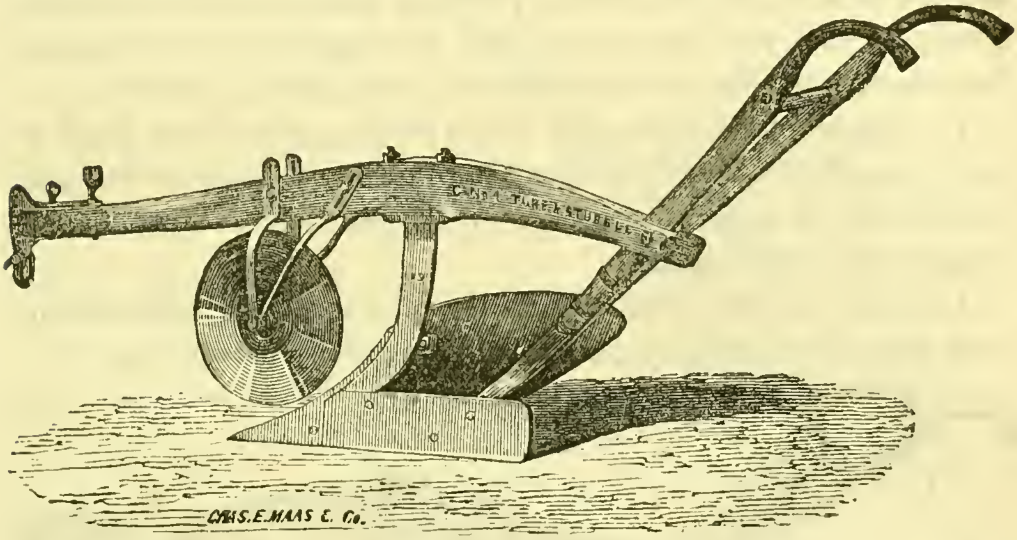


THE COLLINS PLOUGH.

But even cast steel ploughs made in this manner were found to be defective. They could not be uniformly tempered. Many of them, therefore, would not scour perfectly and run clean. The process of hammering, rolling, and bending, would produce a strain upon the fibre of the steel. It would stay in shape only while it was cold. It would warp while heating to get the requisite temper, and warp still more while cooling off again.

Very few, therefore, could be brought to a sufficient temper for a good scouring plough, so that even if it could stand the heat to produce a proper temper, the warping would ruin the form, so that the sections of the ploughs could not be duplicated, which is requisite in order to supply new shares in place of those broken or worn out.

To remedy these defects, a most important invention was made by Mr. F. F. Smith, of Illinois, in 1860, that of casting ploughs from molten steel in iron moulds, a process which was adopted by the Collins Manufacturing Company, of Collinsville, Connecticut, the same year. It was a process of casting cast steel, and hence the ploughs are known as cast cast-steel ploughs.



THE COLLINS PLOUGH.

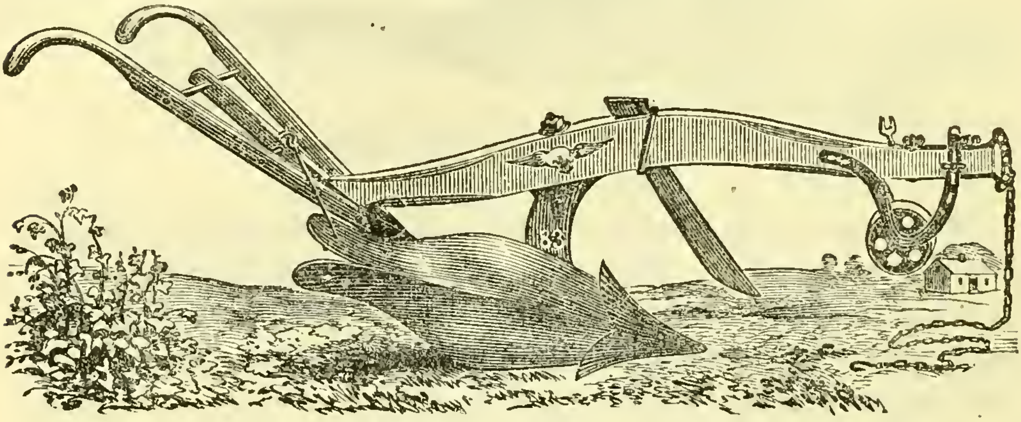
Being cast to form, they will keep that form after receiving the highest temper. They can, therefore, easily be duplicated from molten cast steel. This process forms a hardened cast steel plough that the quartz sand, found in many prairie soils, does not scratch. The sections receive their temper kindly, because the metal is "set" in the iron moulds into which it is poured, and where it has no strain upon its fibre. They do not warp in heating or in cooling, so that the parts are duplicated perfectly. A cast cast-steel plough has all the advantages of cast iron, and hardened cast steel combined.

The Collins plough, though a comparatively recent invention, has rapidly gained popularity and favor, especially on the prairie farms of the West. When tempered hard, it never clogs, but clears perfectly in sticky soils, and hence its draught is light and easy. So far as its form and mechanical finish are concerned, it is all that could be desired.

Among the advantages claimed for the Collins cast cast-steel plough, are: *First*, that it will last much longer than any other steel plough. Sheet steel is often "cut through" after a short wear in gritty soils: *Second*, that it will scour in the most difficult soils, where other ploughs fail, the extreme hardness of the steel preventing all scratching, and the high polish enabling it to shed the mould, however sticky it may be: *Third*, that it draws one-fifth lighter than other ploughs cutting the same width and depth: *Fourth*, that the share can be sharpened, or a new steel point welded on as readily as on the ordinary plough, by any blacksmith, the steel being perfectly malleable, and working kindly: *Fifth*, that any section can be duplicated or replaced, the share, land-side, and mouldboard, being cast in moulds.

Though absolutely essential to the prairie soils of the West, a steel plough is equally serviceable on many other soils, and many think it superior on account of its greater lightness of weight and of draught.

A plough is often required for side hills, or rough and uneven land where the ordinary plough cannot readily be worked.

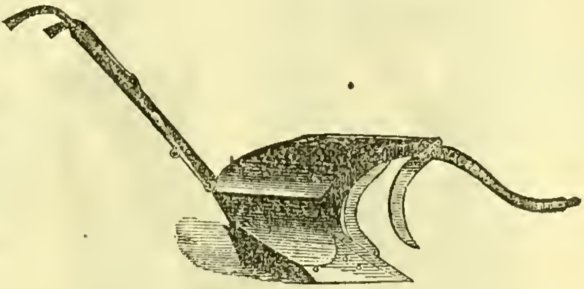


SWIVEL PLOUGH.

What is called the Swivel plough, is used for this purpose, the mouldboard being constructed double, and so as to revolve from one side of the standard and beam to the other, making a right or left hand plough at pleasure, while the team is in the act of turning at the end of the land. The hook being lifted it turns of itself, or with only a slight effort, from one side to the other. The ploughman may begin on the lower edge of a side hill, and turn his furrows all down the slope, or he may begin on one side of a level field, and lay his furrows all one way, and so avoid the dead furrow in the centre and the ridging on the sides. Now that the mowing machine has become so universal, it is quite important to keep the land level, and hence the Swivel plough is coming into general use upon well managed farms.

This plough, manufactured by the Ames Plow Company of Boston, received the medal, or highest premium, of the New England Agricultural Society, at the great plough trial at Amherst, in 1868.

A new invention, known as the Reversible Plough "Victory," was entered by the ingenious inventor, C. W. Sykes, of Suffield, Conn. This plough did admirable work, and attracted a full share of attention.

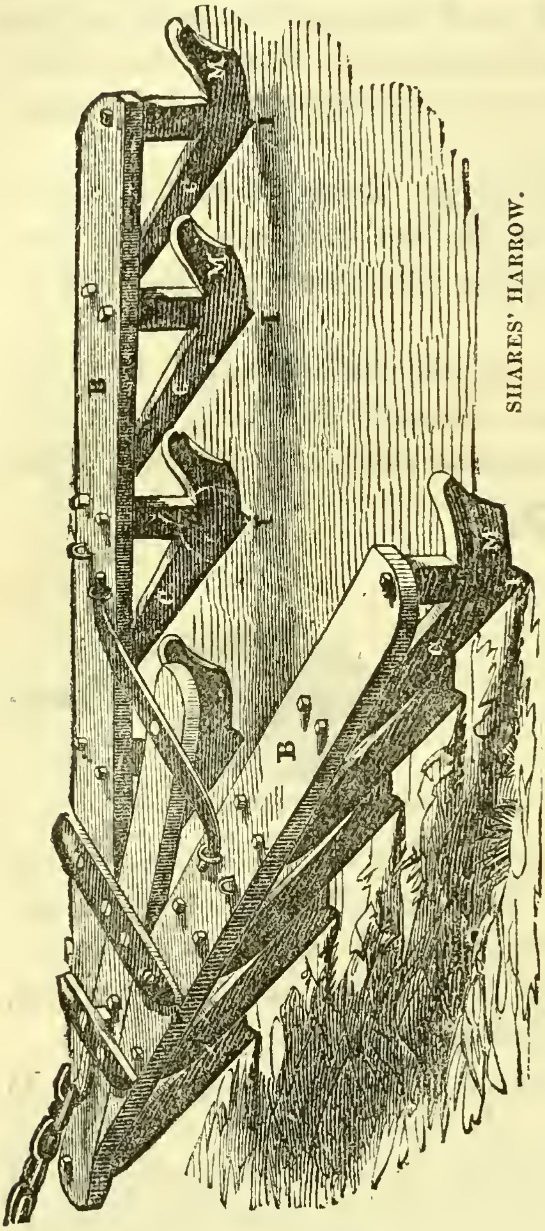

PLOUGH "VICTORY."

The essential points claimed for this implement are ease of draught, ease and facility of reversing the mouldboards, freedom from clogging, perfection of turning the sod, ability to take the furrow immediately on being thrown out in meeting an obstacle, and adaptation to level as well as to side hill land and to soils of every description, and that in case of the breaking of one of the mouldboards, the land can still be ploughed, using the other as a common plough.

The cut gives but an inadequate idea of the implement. It is an over-beam swivel plough. It took the second prize for sod ploughing on level land in competition with several others. It is to be manufactured by the Peekskill Plow Company of Peekskill, New York.

Probably no implement on the farm has been so little improved till within a recent period as the harrow. It is somewhat strange that it should have been so, since few implements are of greater necessity. It naturally follows the plough, and as a means of working the land to a proper condition for the reception of seed it must be regarded as only second in importance.

One of the recent forms which this implement has assumed is that known as Shares' Harrow, and for some purposes it appears to be superior to all others. The advantage of this lies in the form of the colters, which are broad thin blades of cast-iron; or, what is far better, of steel, because lighter, less easily broken, and less liable to wear dull. These teeth, or colters, incline forward, which prevents clogging with grass roots, stones, or clods. There is a mouldboard attached to and forming the lower end of the colter. This harrow is six feet wide when expanded, but may be closed up to two feet, for transportation. It is usually made seven feet long, and weighs about one hundred and fifty pounds.



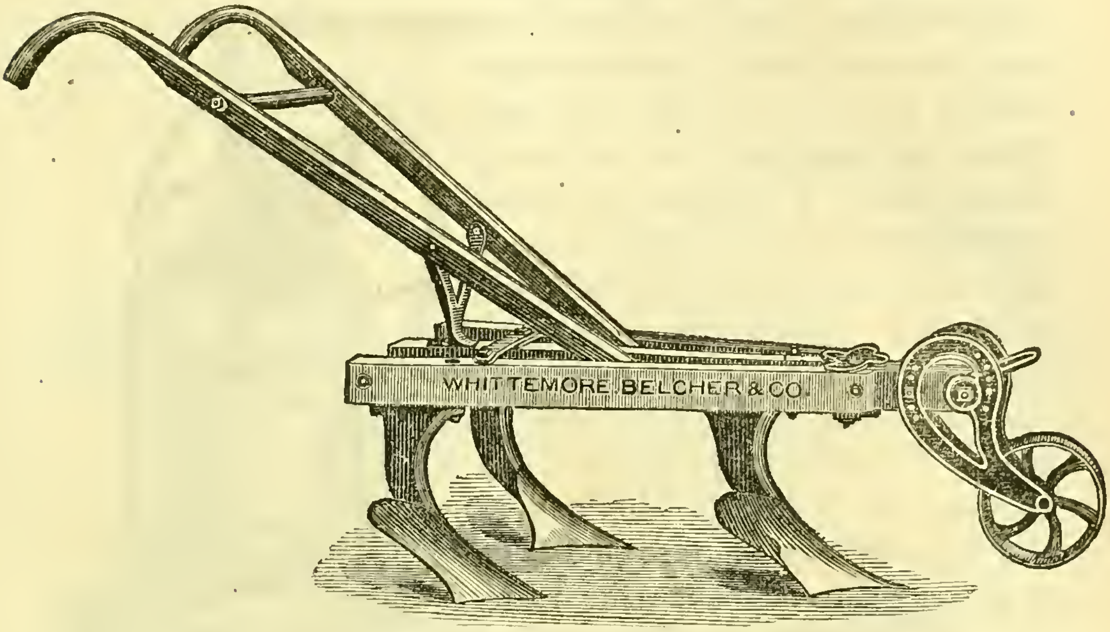
SHARES' HARROW.

For pulverizing the surface of sod land I know of no harrow equal to this. The sharp flat blades, or teeth, sloping backward like a sled runner, cut the soil very effectively, pass over and press down the sod, while, at the same time, shaving off and grinding up finely the upper surface. A single passage of this implement will mellow the surface more than twice as deeply as the ordinary harrow; acting also like a roller, to press and keep down the grassy sod.

This implement is manufactured by Whittemore, Belcher & Co., at Chicopee Falls, Mass., and may be seen at their warehouse, 34 Merchants' Row, Boston.

The same firm manufacture, also, an Improved Horse Hoe.

By a simple change in the arrangement of the teeth or colters it is admirably adapted to the cultivation and hoeing of most kinds of crops, while the high standards prevent the liability to clogging, so troublesome in some implements of this kind. It is adjustable to various widths, from fifteen to thirty-six inches, and will readily work from three to six or seven inches deep.


WHITTEMORE BELCHER & CO.

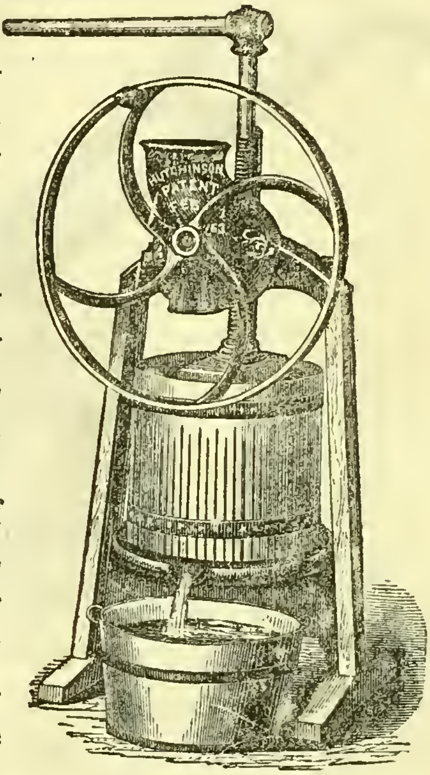
WHITTEMORE'S HORSE-HOE.

On pages 149 and following, of the Abstract, or second part of this Report will be found a valuable essay upon the preparation of domestic wines for medicinal purposes from various fruits easily accessible. We know, also, that vinegar made from cider is altogether more healthful than that made from the deleterious substances which enter into the vinegar too generally found in our markets.

Many a small farm has a supply of apples and other fruits, which, for want of adequate means of economizing them, are of less value than they might otherwise be made. A hand cider mill is, therefore, a great convenience to the small farmer. With it he can crush, and grind, and press his apples, his currants, his grapes, etc., and make them into cider or wine, at a trifling expense of time and trouble.

The best mill which I have examined is Hutchinson's patent —a simple and convenient machine, of various sizes, that has often been exhibited, and taken premiums. This mill enables the farmer to produce sweet cider and wine at any time, and thus to save many fruits that would otherwise be lost. The juice comes out clear and sweet, and if from sound apples, will keep good a long time. The fruit is first crushed, and then ground into a fine pomace, without breaking the seeds, and discharged into the press beneath, to be pressed out at convenience. The pressing is a simple and easy process.

All the iron work, with which the juice would be liable to come in contact, is covered with a durable preparation that prevents all rust, and keeps clear and free from anything disagreeable. The screws are made of wrought iron, with a fine thread. The teeth of the grinder are not liable to clog. From eight to ten bushels of apples, grapes, currants, etc., can be ground by hand power in an hour. For simplicity, neatness, and compactness, I know of nothing of the kind superior to this; and as it is always ready to make a quart, or a barrel, of cider or wine, at any time, it is an article of great convenience. It is manufactured by the Peekskill Plow Works, at Peekskill, New York.



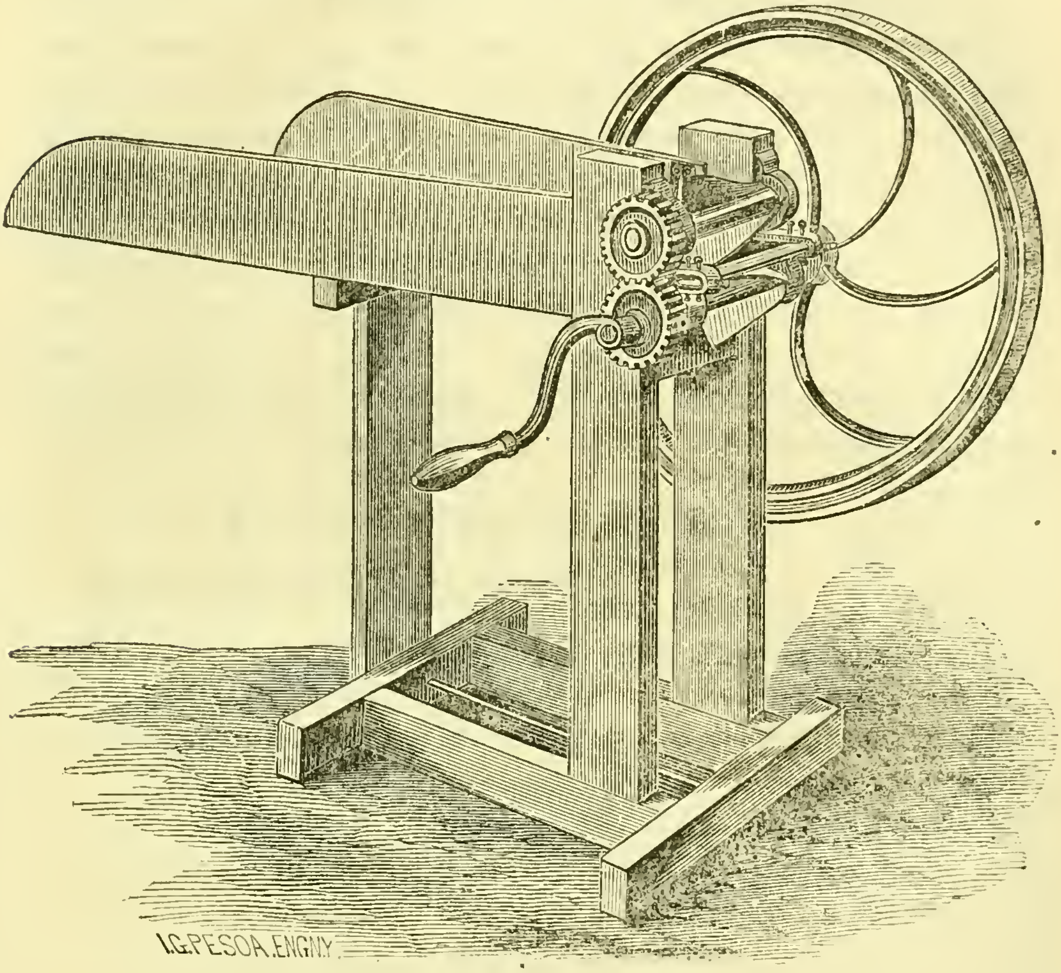
HUTCHINSON'S CIDER MILL.

The Ames Plow Company have the agency of this mill in Boston, where it may be seen at their warehouse over Quincy Hall Market.

Among the Fodder Cutters, so important upon the stock and dairy farm, I am not aware that any new or improved features have been introduced during the past year.

The Self-Sharpener, so long a favorite and popular implement and always regarded as among the best of its class, still maintains its high position, and immense numbers of it are sold every year. This simple and valuable machine is manufactured by the Messrs. Belcher & Taylor of Chicopee Falls, whose reputation for good workmanship is a sufficient guarantee of quality and durability.

It is gratifying to find so much activity of thought and invention in the application of mechanical principles to agriculture. The numerous patents issued for agricultural machinery of one kind and another, the great number and capacity of establishments devoted to the manufacture of farm implements, all indicate a wonderful development in this direction. The amount of capital invested in this class of implements in this country exceeds five hundred millions of dollars. The difference in economy between working at a disadvantage with poor tools and the use of the modern appliances to lighten labor and to save time, is becoming clear to every farmer.


I.G.PESOA.ENGNY.

SELF-SHARPENING FODDER CUTTER.

The societies have wisely encouraged improvements in agricultural mechanics, both by offering inventors and manufacturers of farm implements the best of all opportunities to bring their inventions to the knowledge of the people and by direct awards of prizes. Their efforts have no doubt contributed largely to stimulate the inventive genius of the country.

It may be doubted, however, whether the present too frequent mode of awarding premiums on implements exhibited in competition at the fairs is not productive of more injury than good to the public. How is it possible to decide the comparative merits of mowing-machines, hay-tedders, horse-rakes, and many other implements, without a practical trial on the field?

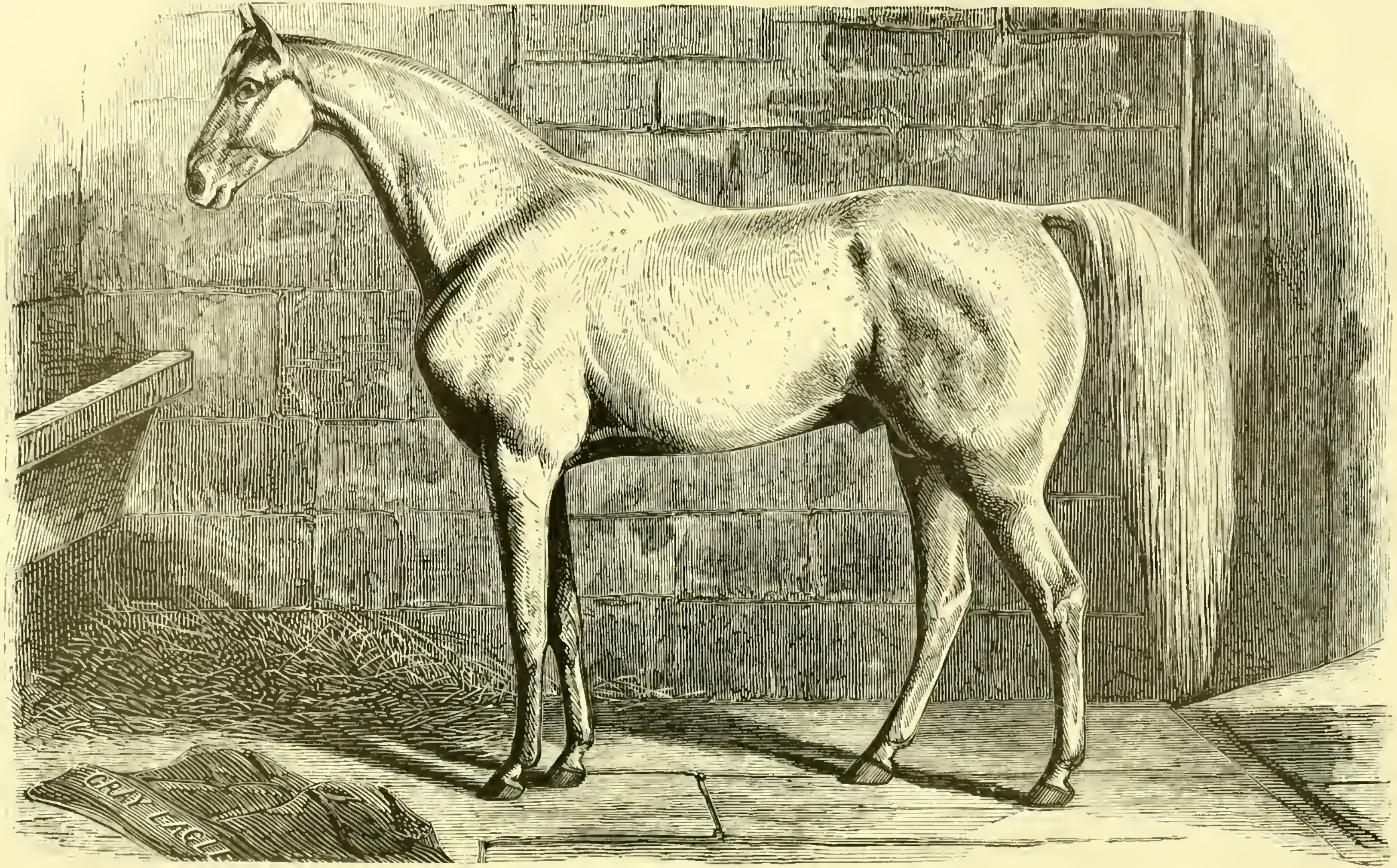
This mode of making awards opens the door to great injustice to competitors, and ultimately to the whole farming community. With many kinds of implements it is by no means easy to arrive at a correct conclusion as to their comparative merits, even by a careful trial, and without such trial it is simply impossible.

Now, an award under such circumstances, often made on the judgment of an individual member of the committee, not only works to the disadvantage of unsuccessful competitors, but the successful competitor uses this endorsement to establish the reputation of a machine which, on a careful, practical trial, may prove to be inferior. It amounts to an imposition upon the farming community. The farmer has a right to suppose that such awards are based on comparative merit, and this he knows can be ascertained only by trial. He has a right, therefore, to suppose that such trial has actually been made.

CHARLES L. FLINT,

Secretary of the State Board of Agriculture.

Boston, January 27, 1869.



"GRAY EAGLE."—Thorough-bred Stallion, Owned by W. W. Chenery, of Belmont.
See Preface to Abstract.

APPENDIX.

REPORTS OF DELEGATES

APPOINTED TO VISIT THE

AGRICULTURAL EXHIBITIONS.

ESSEX.

I was present at the forty-eighth annual exhibition of the Essex Agricultural Society, which was held in the beautiful city of Newburyport, September 29th and 30th. This society is not only one of the oldest and wealthiest in the State, but it is the only chartered Agricultural Society in this large country, (of which plan I approve.) By its united efforts it has a fund of $12,000. This county contains a number of cities and many large and flourishing villages; its population is neither devoted to agriculture, manufactures nor mechanic arts, but is a community made up of all, acknowledging agriculture to be the foundation of all its industries. The annual meeting of the society was held on the first day at half-past ten. Previous to that, the trustees, committees and members of the society met in the basement of the Green Street Church, where the committee rolls were called and vacancies filled. While in session, the boys and others less interested at the church, were arranging the animals and agricultural implements on the mall. At eleven o'clock the ballot resulted in the unanimous re-election of Gen. Wm. Sutton, of Peabody, for President, and Charles P. Preston, of Danvers, for Secretary, showing conclusively that the right men were in the right place. At three o'clock, P. M., the popular president entertained the officers, trustees, invited guests, and prominent members of the society, at the Merrimack House, (kept by the Little, Brothers,) with a sumptuous dinner. This society has no particular agricultural grounds, but migrates from one part of the county to the other once in two years, thus uniting the interests of the county in one good society.

The show of cattle at the mall was very good, consisting of some fine specimens of Jerseys, Ayrshires and Durhams. The number of contributors was large. Mr. Wm. A. Russell had the only Dutch cattle on exhibition, showing his mammoth bull, Zuyder Zee, weighing 2,500 pounds. The exhibition of sheep, not large, consisted of Cotswolds and Southdowns, but was very commendable.

The show of poultry was very superior, consisting of many popular varieties and fine specimens. A collection of twenty varieties of imported pigeons, including some carrier pigeons, was contributed by Mr. George W. Boynton, of Georgetown. By their beauty and novelty they attracted much attention. The show of swine was very good, being fully up to the standard of other societies. The tent for farm implements was well filled with a fine display. The trial of oxen and draught horses was on Auburn Street; thirteen pairs of oxen competed, and about the same number of horses; the load drawn up the hill was 2,400 pounds. The horses consisted of brood mares, family and draught horses; some fine stallions and colts, one of which was fourteen months old, weighing nine hundred pounds, sired by Conqueror, owned by the State society.

The City Hall presented a superb appearance. The platform at the head of the hall was covered by a profusion of rare flowers; the number of entries was eighty-four. Two large tables laid with about five hundred plates filled with many choice varieties of apples, and a like number with pears of different varieties, denoted that the people of Essex understood how to be successful in pear culture. Many contributed superior grapes, indicating a knowledge of E. W. Bull's grape culture. Peaches were not abundant, but very large in size and appearance. The show of vegetables in the City Hall was good. Those by S. A. Merrill, of Maple Hill Farm, Danvers, was an essential feature of the collection. J. J. H. Gregory, of Marblehead, also showed a great variety of seeds with his vegetables, including the "Early Rose Potato." The show of domestic manufactures was very small; from the meagre exhibition of boots and shoes, you would hardly think Lynn belonged to Essex County.

The ploughing match was at ten o'clock on Wednesday; many of the ploughmen being very enthusiastic. Three special premiums offered to boys by the president, excited much competition. I was reminded of what Milton has happily said, "Peace hath her victories no less renowned than war." Agriculture makes the country. We must exert ourselves in our calling, and not forget that we are component parts of a great whole. Let more of our young men become practical farmers; it is better than a "clerkship." Circumstances rendered it necessary that I should leave early Wednesday, which I regretted for many reasons, not being present to hear the able address of Dr. Loring, which was one of his best. Much more might be said on these various topics and not be superfluous.

I am fully satisfied that the Essex Agricultural Society is exerting a good influence in the county, and the State bounty well expended. I shall long remember with pleasure the cordial hospitality extended to me by the president and secretary of the society.

IMLA K. BROWN.

MIDDLESEX NORTH.

The exhibition of this society took place at its grounds in Lowell, on Wednesday and Thursday, September 23d and 24th. The weather was by no means propitious, and the more delicate animals evidently suffered from exposure to the storm, in the open pens provided for them. The most noticeable cattle on exhibition were Alderneys, manifestly selected by the citizens of Lowell and the surrounding country, for the supply of dairy products to those who are particular in such matters. Owing, undoubtedly, to the inclemency of the weather, the exhibition was a small one. But both in the cattle-pens, and in the hall, were found abundant indications of attention to those special branches of agriculture, which find patronage in a large manufacturing city. In the cultivation of fruit and vegetables, there was evidence of the exercise of great care and skill. And it was apparent that the farmers of North Middlesex have learned to what they can devote themselves, with assurance of profitable returns from the market at their very doors. There can be nothing more encouraging, than such indications of an intelligent appreciation of the opportunity which each locality affords the farmer. In this way, and in no other, can farming be made profitable, and in no other way can it be developed to that standard of excellence, which is alone worthy of all the effort now going on for its improvement. It is not always that one can discover what the precise tendency of local agriculture is, from an exhibition. But it is evident that such a lesson should be learned on every fair ground; and, when an exhibition has this characteristic, it is interesting, however meagre may be the aggregate amount of animals and products, collected for show and examination. That there were valuable animals on the ground, at Lowell, it is only necessary to mention the Ayrshire cow of Mr. Lawson, and the bull of the same breed, belonging to Dr. Ayer, as well as the grades of Mr. Holt, Mr. Crosby, Mr. Higgins, Mr. Swallow, and Mr. Burnap. And the evident attention paid to the cultivation and improvement of the potato, and other vegetables, is entitled to the highest commendation.

This society has been laboring for some time under some financial trials, which, your delegate was happy to see, are in a fair way to be relieved through the liberality of its members. At the dinner-table in the commodious hall, an appeal was made, which met with a hearty response. And there can be no doubt that through the energy of its officers, it will be brought to a new career of energy and usefulness.

The attention of the committee of this society to the work assigned them, is worthy of special notice. Careful examination of and elaborate discussions upon the various articles submitted to their inspection, indicated a determination to perform their work well. And there can be no doubt that their reports will be valuable contributions to our agricultural reading.

Geo. B. Loring.

MIDDLESEX SOUTH.

As delegate from this Board, I attended the Middlesex South Agricultural Society's Exhibition held at Framingham, September 22d. On arriving at the depot I was cordially welcomed by their representative, John Johnson, Jr., who introduced me to the officers and the several departments of the show, where activity, and a desire to make as good a display of their stock and articles as the time would allow, appeared to animate all parties.

As this section of the State is so well represented by the best breeds of cattle, I had anticipated a good and large show of stock, but in the latter was disappointed, as several parties had withheld their animals on account of the prevailing cattle disease. Among those on exhibition were Shorthorns, owned by H. G. White, showing excellent points of breeding and training. Among his Jerseys were animals of the best types and pedigrees, showing a character for transmitting their points in a remarkable degree.

Doctor Burnett had many of his finely bred Jerseys; one cow as fine points as can be found, which it would require the sum of $1,500 to buy. He has been breeding from importations made by himself and selected with great care, and now thinks, as many others do, that animals bred in this country are an improvement over imported ones in constitution and quantity of milk. There were many other Jerseys at the show representing this class of dairy stock, and owned by men that are becoming assured that money spent for a good animal is well invested. The Ayrshires were not in large numbers, but what were there showed good breeding and well developed milking qualities; on the whole the stock was a credit to the owners.

The little Brittany cattle, owned and imported by our worthy and interested Secretary, C. L. Flint, Esq., reminded me that the old adage, "a great cry and little wool," must be reversed by allowing it to read, a great yield and little food. They must be a valuable addition to gentlemen who are stocking their country seats with small animals. There were many fine horses in the ring, and mares and colts in the pens, displaying points, which, if well developed to maturity, must make valuable horses. Not a large show of sheep, as this locality is so near the best markets that dairying is much more profitable than sheep husbandry. In swine there was a good show of mixed and cross breeds, from which could be selected such as ought to suit all who desire to raise pigs or pork. In poultry several breeds and crosses were displayed. For a market fowl the Brahmas stand well, as they will return the greater weight in a given time for early market.

The show of fruit in the hall was equal to any county show that I have visited, making with the handiwork of the ladies a fine display. Butter, cheese, honey, and bread were so excellent that I congratulated myself that I had not to decide between the different competitors. Vegetables were well selected, and of very fine quality. Agricultural implements were well displayed by their several advocates, and as every one has the best, it rather tends to deter some timid ones from buying, for fear he shall get shaved, and so is like the boy that could not go in swimming till he knew how.

The exhibition on the whole was instructive and well deserving the bounty of the State. The morning of the second day being very stormy, I did not attend, and so lost a good dinner and the address, as well as the after-dinner speeches that were made by gentlemen well versed in practical and scientific agriculture.

JAMES THOMPSON.

WORCESTER.

As delegate from the State Board of Agriculture, I attended the fiftieth anniversary of the Worcester County Agricultural Society, at Worcester, September 17th and 18th. A half century, being more than half the life time of our Republic, bears testimony to the zeal and energy of the members of this society in promoting and encouraging the interests of agriculture. The exhibitions of the first day gave ample evidence that their labor had not been in vain.

The first morning opened with an unclouded sun and an invigorating atmosphere, giving animation to the occasion which had called together quite a large number of farmers. The extensive and well located grounds belonging to the society, afforded ample room for every department of the exhibition.

The cattle, of which there were about three hundred and seventy-five on the ground, consisting of thoroughbred and grade Durhams, Jerseys, Ayrshires and Devons, formed a most interesting part of the show. The fine large Durhams revealed the fact that they had visited rich and luxuriant pastures, and perhaps were not entirely ignorant of the locality of the corn-crib.

The Jerseys, with their gentle manners and amiable faces, and peculiar marks, gave satisfactory evidence that they, or their ancestors were no strangers to the island from which they derive their name. This breed appears to be quite popular; and if quality rather than quantity of milk is desired, perhaps one cannot do better than to select cows from this stock. There were some very fine Ayrshires on exhibition, and a few Devons, which appeared exceedingly well. It may with truth be said that this was a very excellent exhibition of cattle, and probably was not surpassed by any county show in the State.

A few sheep only were entered, and these of inferior quality, and hardly worthy of notice. It is evident that but little attention is paid to sheep husbandry in this county. The reason for this may probably be found in the insufficiency of the fences, the destructive character of many dogs, and the prevalent opinion that it is not profitable. But it may be well for many farmers to keep small flocks, considering that they are valuable helpers in eradicating bushes and briers; that they improve pastures by adding to the fertility of the soil; and, feeding on the summits and sides of the hills, they present to the eye a most agreeable object.

There where about twenty entries of swine. Some grade Chesters, with pigs, were very fine. We think more attention should be paid to the breeding and fattening of swine, instead of being so dependent on the West, from whence sometimes comes disease entering our own pens, and often causing death.

The ploughing match was well contested by twenty ox and horse teams. Some of the ploughing was exceedingly well done, showing good ploughs, skilful drivers and holders, and fine teams.

The trial of working oxen and steers was quite interesting, and drew together a large crowd of persons.

Competent judges pronounced the show of poultry to be good, but not better than usual.

There was a very good display of vegetables in the hall, particularly of squashes and potatoes. Among the latter, fine Harrison and Early Rose. Two pounds of the Early Rose were said to have yielded one hundred and thirty pounds. John Farwell, of the Poorhouse, made the largest and best show in this department. We noticed in this collection twelve varieties of potatoes, embracing most of the kinds recently introduced. The contribution of vegetables from the Lunatic Asylum was large and of excellent quality.

Fruits and flowers were not largely represented. The exhibition of the Worcester Horticultural Society being open the same days, received a large proportion of the products of the garden and orchard.

There were eight contributions each of butter and cheese.

Of manufactured articles the show was large and interesting. The Ames Plow Company had on exhibition twenty-nine ploughs, of as many different patterns, and adapted to every description and condition of soil. They were nicely finished, and looked as if they would do good service to the farmer. The mould boards were hardened by a process recently discovered, imparting a steel-like character to the surface of the metal, and making it susceptible of a high polish in the wear, and yet retaining all the original strength and toughness of the metal.

Churns, vegetable cutters, wheel-jacks, and many other farm implements and machines, all of excellent workmanship, were exhibited. Two sleighs, entered by Williams & Bacon, of Westborough, and a top-buggy, by G. C. Denhurst, of Worcester, attracted much attention.

At one o'clock a large number of persons sat down to a well provided dinner-table, at which the president of the society presided. After the dinner Governor Bullock delivered an eloquent address, paying a just and beautiful tribute to the memory of the late Governor Lincoln. Well may the members of this society cherish with respect and gratitude the memory of Governor Lincoln; for to him, more than to any other person, are they indebted for whatever of prosperity and success it has had.

Hon. George B. Loring, Gen. Charles Devens, and Hon. Stephen Salisbury made instructive and interesting addresses.

The second day was entirely devoted to the horse. A very large number of persons assembled to witness the trotting match, for which premiums of fifty, sixty, one hundred, and five hundred dollars had been offered.

Most noticeable, on both days, was the good order that prevailed and the respectable appearance of the assembled people.

It gives me great pleasure to say that I received from the president of the society and other gentlemen, a most cordial reception and very kind attentions.

Albert Fearing.

WORCESTER WEST.

Having found that my assignment from the Board to visit the Worcester South would necessarily conflict with my duties in connection with the Housatonic Society's fair, the two fairs being held at the same time, I made an exchange with my friend, M. F. Watkins, to visit Worcester West at Barre, while he should visit at Sturbridge. Agreeably to exchange, the morning of September 24th found me at Barre, ready to engage in the duties, festivities and pleasures, and with eyes open and ears unclosed to endeavor to compare notes, and to give and receive suggestions that might arise from thus meeting with the farmers of central Massachusetts. In my ride from Brookfield to Barre, I was prepared to expect that the dairy would take a prominent part in the exhibition, both as to the show of cheese and butter in the hall, and also the show of cows upon the ground. My expectations were fully realized in both departments.

The renowned butter-makers, the Alderneys, were there, as shown in the herd of John Brooks, Esq., of Princeton, who also exhibited specimens of the milk of his several cows, thus giving each one the privilege of noticing the difference of cows even of this renowned breed in furnishing cream for butter-making. A very perceptible difference was shown in the amount of cream actually obtained from his dairy of Alderneys. Your delegate would have liked to have seen specimens of the milk of the Ayrshires and Durhams exhibited at the same time, that one could the more easily form an opinion as to the relative merits of the different breeds as producers of butter. The thoroughbreds did not prevail at the fair, as, in the opinion of your delegate, they should do, and I would recommend the offering of no premiums except to such as have their pedigrees fully established.

Good specimens of the Durhams and Ayrshires were there, but no breeders of bulls of their own, except Mr. Brooks, of Princeton. Let us endeavor to improve our stock by breeding from animals only that are pure-blooded. The show of grade cattle was good, and the exhibition of oxen was fine. A commendable zeal was manifested among the ploughmen to see how well their part of the exhibition could be sustained, and in most instances the ploughing was well done. In the sheep department and the swine also were good specimens, but not extensive in numbers. I come now to the hall, and find that the *ladies* by their handiwork have vied with their *liege lords* to sustain their part of the exhibition, and I would say it was well sustained. In needle-work and in flowers a large variety of articles was found to delight the eye and to create a study of the beautiful in nature and art.

The dinner in the hall and feast of reason followed, where the members and their wives gather around the festive board and annually renew the social relations already formed. This part of the programme is evidently an institutition of eastern and central Massachusetts instead of Berkshire County. The morning of the second day was very rainy, so much so that the exercises were adjourned for one day, and your delegate could not remain to report upon the close.

T. D. THATCHER.

WORCESTER NORTH-WEST.

The annual exhibition of the Worcester North-West Agricultural Society was held at Athol, on Tuesday, September 15th, 1868. The interest manifested in this exhibition was highly creditable to those interested in the agriculture of this section of the Commonwealth. No enclosed grounds having yet been provided by the society, the exhibition occupied the village green, which was thronged by a multitude of people carefully examining the specimens of cattle and horses which had been collected there. The appearance of these animals was good. Had the bulls on exhibition been pure-bred animals of any specific breed, it would have been more gratifying to your delegate; and he hopes and believes that the funds of this society will be devoted in some measure to the encouragement of that class of animals which will improve the herds of this section. The appearance of the cows and heifers was quite creditable, those from Athol, Phillipston and Royalston being particularly noticeable. Of working oxen there was an excellent collection. And the care with which these cattle had been trained, both by the farmers themselves and by their boys, was highly gratifying. The towns of Phillipston and Royalston exhibited large town teams of valuable cattle. A very good collection of horses of all work was exhibited, as well as some valuable breeding mares and colts. The hall was remarkably well filled with the products of the garden and the dairy, and with specimens of many industries of the locality. It is impossible to enumerate them here, but the ingenuity and skill devoted to many of these articles of convenience are worthy of special notice. And the specimens of female handiwork attracted, as they deserved, much attention, both on account of their admirable workmanship, and on account of their indication of the industry and careful housewifery of those who made them.

The exhibition was one of the few fairs now remaining conducted on the old-fashioned system, and, with the exception of the hall, open to all visitors. So far as the good effect upon the surrounding agricultural community is concerned, there can be no doubt of the effect of this system. And it is refreshing to be reminded now and then of that primitive mode which our fathers pursued when agricultural investigation was in its infancy, and when an agricultural fair was an economical rivalry for excellence in cattle, crops, cultivation and general husbandry. The enterprise manifested by this young society in its first efforts promises well for the future. Stepping out of the simple ways I have described, the trustees have purchased grounds "upon which they can locate their fairs, and have ample room for the exhibition of stock, produce and mechanic arts." And there can be no doubt that the society, situated as it is in an industrious and enterprising portion of our Commonwealth, will soon reach that standard of excellence which its trustees desire, and which will stimulate all profitable agriculture in the section which it covers.

Geo. B. Loring.

WORCESTER NORTH.

The Worcester North Agricultural Society held its sixteenth annual fair September 29th and 30th, 1868. Both days were good for the occasion. Never having before visited an exhibition in this place, I had no preconceived ideas in regard to what I might behold.

I notice in the report made of this society, that last year was the first season that the society held their show on their own grounds, and like the Patriarchs of old, the officers and others had to dwell in tents for the time being, having no other shelter for man or beast; but now, instead of canvas, you find a large commodious building and other accommodations, which I shall more fully speak of hereafter, and for the details I am indebted to the president of the society.

The grounds of the society are located on Summer Street, one and one-third miles from the railroad station in Fitchburg, and contain about thirty-three acres. Near the grounds are two beautiful groves and a pond, which, if not already "spotted" and visited by parties of pleasure, soon will be among the attractions of Fitchburg. The society during the past year has erected a substantial building for their exhibitions and other purposes connected with the interests of agriculture. This building is constructed of wood, two stories high, 50 by 100 feet; the lower floor is devoted to the exhibition of fruit, flowers, vegetables, and manufactures. I noticed that notwithstanding the good size of this building, that most of the bulky implements of husbandry had to remain outside of the house; but I am informed that soon an addition of at least fifty feet will be made. The upper floor is divided into offices, a kitchen and dining hall; the latter of sufficient size to seat four hundred persons, with tables built for the purpose, well adapted for the use designed. The trustees' room is well and suitably furnished with chairs, settees, and tables; its accommodations are worthy of commendation and imitation, as every society needs a permanent place for meetings to transact their yearly business. The society has also erected over two hundred excellent sheds, costing $1,400, for the shelter and accommodation of cattle and horses; about one hundred of these sheds are on the west side of the grounds, and used for cattle, sheep and swine; also twenty-five double sheds (making fifty) near the centre of the field, mostly filled with cows and young stock. On the south side of the grounds are thirty-five sheds or stalls for horses, with barn for fodder and wells of water. We also noticed suitable scales for weighing. We think these buildings, in affording security and comfort for the animals, are not surpassed, if equalled, by any other society in the State.

In regard to the financial condition of the society, it has borrowed $7,000 to defray the expense of the buildings. It has assets in real estate, $16,000, and personal at least $500, besides about $600 in cash for necessary expenses.

The fair may be considered in every respect a success. The attendance was large, and the receipts quite satisfactory.

It strikes me as uncalled for on my part to attempt to give a detailed account of the various blood and grades of cattle, pedigree of horses and other animals on exhibition, inasmuch as your Board gets a full report from the society; and will only remark that there were present, about 68 cows, 20 bulls, 29 heifers, 46 calves, 31 sheep, 5 swine, a few fowl, town team from Leominster containing 21, and also from Sterling with 18 yoke of cattle. The display of draught and carriage horses was good; also breeding mares with colts. Good specimens of ploughing and drawing with both horses and cattle were given.

In the department of fruit and vegetables the array was superior in numbers, and in many instances in quality. A large collection of manufactured articles arrested the attention of the visitors, embracing an endless variety, among which were many novelties. The exhibition of butter and cheese was quite limited.

The annual address delivered on the second day of the fair, by Col. Needham, was listened to with interest, and I doubt not with profit. The benefit to be obtained by the annual gatherings of our farmers for the purpose of exhibiting their products, relating to each other their experience and observations, comparing notes as to results of new measures and experiments, has been well and often remarked upon, and they are to be encouraged and sustained in every honorable way; but there should be a vigilant eye that nothing creeps in to give it a bad name, which would be a reproach to any people.

I am not unmindful of the courteous attention of the president of this society and the very generous hospitality of its active and efficient secretary.

Chas. C. Bassett.

WORCESTER SOUTH.

Early on the first day of October your delegate arrived at Sturbridge, and found the members of the society wide awake and hard at work. Everything was under motion, promptly keeping step with the programme. The oxen were in the yoke, the cattle in their pens, poultry and swine in their cages, and the committees were on hand waiting for their instructions.

The exhibition grounds are large and pleasantly located, purchased and fenced the past season, upon which the society has built a spacious hall, combining economy, durability and convenience, with ample rooms for exhibition and dining purposes and for public speaking. A good half mile trotting course, wide and thoroughly graded for horses; pens, shelters and hitching posts, ample and secure, the whole arrangement costing about $12,000. The ploughing match was the first order of the day. There were ten yoke of oxen and one pair of horses manned by skilful ploughmen competing for the society's premium. This society seemingly fully appreciate the importance of this branch of agriculture, and realize that without good ploughing there can be no good husbandry, and that bad ploughing insures hard planting, hoeing and an inferior crop. Thirty-five yoke of working oxen and steers were upon exhibition, Devon blood predominating. Not a pair came under my notice that was not worthy of a post and a place on the grounds. They were well matched, of good style, and well trained. Their strength and training was tested in a thorough manner, being a very attractive feature of the exhibition. I found nine bulls upon the ground, representing Devon, Durham and Ayrshire blood, fair samples, but not remarkable, several of them falling below my ideal of what constitutes a desirable progenitor of neat stock.

Among the thoroughbred stock on exhibition, the herds of Bela J. Stone and S. A. Dresser attracted much attention, Mr. Stone having sixteen and Mr. Dresser fourteen head of Ayrshires.

The exhibition of horses came chiefly on the second day. A commendable display of this worthy animal was brought forward. The exercises of the day were opened by a grand cavalcade, reaching entirely around the half mile track. Six stallions were on exhibition, twelve breeding mares, six pairs of draught horses, a fair display of colts, twenty single carriage horses, six entries for fast and light work—a modest name for fast horses.

I conclude there are but few lovers of good mutton in this vicinity, as but very few sheep were to be seen. Those presented were good specimens, however. Swine and poultry were more abundant. My attention was called to a breeding sow whose litter-ary labors were reported enormous, having done her best at eight efforts, and succeeded in bringing forth and raising one hundred and fifty-seven pigs.

Of the thousand articles displayed in the hall, I shall speak in general terms as being carefully arranged, displaying taste and order, consisting of a great variety of the products of the house, farm, garden and workshop, being mainly articles of high order, deserving merit, of which much might be said in praise.

The address was eloquent and instructive, delivered by the Rev. John Boyden, of Rhode Island. He said the farmer occupied an important sphere in society, and urged the importance of managing the farm so as to make it better, home and its surroundings pleasant, and life happy.

This society appears to be in a prosperous condition, and its usefulness in the promotion of agriculture and art is unquestionable. Your delegate was received with courtesy and kind attention, rendering our visit at Sturbridge very agreeable, for which I would express my sincere acknowledgments. M. F. Watkins.

WORCESTER SOUTH-EAST.

Happening to be present at the ninth annual fair of the Worcester South-East Agricultural Society at Milford, September 29 and 30, we were requested by the president, William Knowlton, Esq., in the absence of Mr. Pierce, the regular delegate of the Board, to take notes and report the same. This we do with the more pleasure as we have nothing but success and prosperity to report. We had supposed that the south-east part of Worcester County was a good place to manufacture shoes and raise men, and had no expectation of finding such evidence of agricultural enterprise as the halls and grounds of the society furnished. The pens were well stocked with cattle, sheep and swine, and nearly every breed was represented. The Devons were evidently the favorites with the working farmers, and the Jerseys with the gentlemen farmers, and for the family cow. Long strings of oxen with ribbons streaming from their horns came marching in from the neighboring towns, advertising the fair as they came. Premiums were offered and awarded for the largest and best town string, which called forth much competition. We commend this plan to other agricultural societies. In no way can they better advertise their exhibitions, and call together men to study the different herds and the best points of cattle. As these strings were paraded around the track, they elicited as much attention and comment as do the racing horses on some other grounds. The attention and applause were still greater when the trained oxen were exhibited. These were generally full blood or high grade Devons, and though we have been teaching most of our days, we had no idea that an ox could be taught so much. We shall never again use the comparisons, "slow as an ox," "dull as an ox." The evolutions these Devons performed would compare favorably with the military evolutions at West Point. When standing in a line, with heads erect, they seemed like a regiment of soldiers ready to make a charge. Single pairs of oxen were placed head and tail together, and one would back as the other advanced, almost keeping step. The near ox would take the place of the off ox, and one stood quiet as a post while the other walked around him, and in his turn would make the circuit while the other stood still. All was done without noise on the part of the drivers. A nod of the head, a word or gentle tap of the whip, the oxen seemed to comprehend and obey. We have been in schools where the children understood the wink of the eye and the motion of the hand of the teacher, and all went orderly as clock-work, but we never expected to see cattle in such good subjection. Their motions, too, were quick and nervous, and their eyes full of intelligence, and they seemed to share the pride and pleasure of their owners. We were more than ever convinced of the truth of the saying of Holy Writ, that "God made man to have dominion over the fish of the sea, and over the fowl of the air, and over the cattle," and that this dominion is asserted and maintained, not by violence and noise, but by the still small voice, by kindness and decision. Rarey has taught us a lesson in training horses which may well be extended to cattle and all our domestic animals.

In the hall we found a very extensive exhibition of fruit and vegetables, and the usual display of fancy work and domestic manufactures. Of apples there were thirty-eight entries, all extensive and excellent; of peaches and grapes, thirty entries, and of vegetables, fifty-five, embracing three hundred different specimens.

On the second day came the ploughing match, on the grounds of L. B. Felton, Esq., and the competing teams were escorted to the scene of their trial by over fifty pairs of cattle, reminding us of the display of the hecatombs, as sung by Homer. Next in order came the trial of oxen on draft, steers on carts, and steer calves, and when we saw the latter we learned the secret of the trained oxen. They were taught to bear the yoke in their youth, and obey in their steerhood. The boys managed the calves much as their fathers managed the oxen. Then came the dinner, which was excellent, and was shared and graced by the ladies; and after the dinner, the speech, of which the less said the better; and after the speech, the horse trot, which was not of the purely agricultural character, as it was under the auspices, we were glad to learn, of another association entirely distinct from the agricultural society.

All the arrangements reflected great credit on the officers. There was an enthusiasm among the farmers which convinced us that the State was not wasting its money upon the Worcester South-East Society. If President Knowlton were not present we would say that his zeal and energy were manifest in all the workings of the exhibition. Mr. Knowlton is probably the largest landlord and has the most extensive agricultural interest of any member of the Board, and his land, stock and buildings show that he knows how to manage a farm. The Worcester South-East is fortunate in having such a man at the helm.

Our thanks are due to Mr. Knowlton for kind attention and hospitality, and we shall ever remember with pleasure the many pleasant acquaintances we made among the farmers of Worcester County. ALEXANDER HYDE.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

The fiftieth annual cattle show of the Hampshire, Franklin and Hampden Agricultural Society was held at Northampton, October 1st and 2d.

Notwithstanding a cold north-east wind and threatening rain, rendering the out-door exercises uncomfortable, there was the usual number of spectators present.

My visit here was unexpected, but I soon met the officers of the society who spared no pains to render my attendance agreeable. I also learned that the regular appointee, Mr. Davis, of Plymouth, had failed to honor the old Hampshire and Hampden with his presence as a delegate, and my services as a reporter were solicited.

The exhibition in the hall was not as good as in some former years, but a commendable display was before us, bread, butter, cheese, and honey, fruit, and flowers, attracting much attention, and reflecting credit on the contributors. Of vegetables there were many, doing honor to the exhibition and the producers.

Among domestic manufactures I noticed rag carpets, not only useful, but ornamental, numerous bedquilts and counterpanes, in design curious and attractive, in workmanship perfect and highly demonstrative of the ingenuity and patience of woman. In the domain of fancy work there was spread before us embroidery, bead work, tatting, worsted and hair flowers, &c., &c., in quantity and quality remarkable, for which we add, God bless the ladies.

In the miscellaneous department there were stoves, boots, pocket-books, hand-hoes, and handcuffs, pickaxes, bread-cutters, and meat-choppers, clothes-washers and wringers, that wash eight shirts in ten minutes, and churns, that make butter in less than half that time, and sewing machines that were really what they were represented to be; also wagons for business and pleasure; mowing machines, horse-rakes and hay-tedders, corn shellers, threshing machines, upon which the farmer of to-day looks with satisfaction. With grateful hearts we thank the inventor and manufacturer, and bid him "rest not here."

I should do the society great injustice if I failed to report their exhibition of cattle as great, and the society would do the Commonwealth dishonor if they had failed to make their exhibition great. Here in this beautiful valley, the garden of our State, where nature has been lavish, with the improvements of generations that have gone, in years that are past, which the present generation possess, with the accumulated wealth of their fathers, we claim a right to expect much, for where much is given much shall be required.

The exhibition of oxen was, as we had expected, remarkable. There were 19 pairs presented by the farmers of Deerfield, the average weight of which was 3,876 pounds. Old Hadley sent in 15 pairs, other towns contributing freely, making this department worthy of special remark. There were 25 pairs upon the grounds, with an average weight of 3,872 pounds, and numerous yokes of lighter cattle, members of the same happy family, taking their daily rations from the same deep meal chest, and another year will be exhibited at Northampton, weighing 3,800 and 4,000 pounds.

There were several herds of cattle attracting due attention; one of Shorthorns, with twenty-two head; another of Ayrshires, of twenty-two head; also two herds of the famous Jerseys. Among milch cows there was much competition. I cannot forbear mentioning a grade Durham, presented by H. S. Porter, of Hatfield, giving fifty-one pounds of milk daily, and making fifteen pounds of butter a week, fed upon dry hay and a little provender, as a relish; and another, owned by the Commonwealth for the last three years, and in that time brought four calves, and has not been dry a day; her largest amount of milk was twenty-four quarts, and the smallest, six quarts per day. For the best Ayrshire cow was claimed twenty quarts daily; best of the season. Large returns for Jerseys were said to be the rule rather than the exception. Shorthorn stock largely predominated, where other breeds were fairly represented. There were eight entries of bulls, representing the above mentioned breeds. There were but few sheep to be seen, while poultry and swine were abundant.

We noticed the horses with interest. It is seldom we see so many good and so few poor horses at our county fairs, exhibiting thorough training, good keeping, and proud owners. Of stallions there were four entries, five pairs of draught horses, fifteen of carriage, twenty of family, eight trotters, eight breeding mares, and four racers, and colts of various ages, numerous and generally worthy.

At dinner the first day of the fair, His Excellency the governor, Hon. Oliver Warner, and other distinguished gentlemen were in attendance, and interested beyond dispute by their complimentary speeches, the happy audience assembled. In the evening the Hon. Charles Delano delivered the annual address at the Town Hall. He said we were not met to discuss the deep problems of agricultural science, but to exchange congratulations on the progress of our own and kindred societies, to take a retrospect of the past, mark the contrast of half a century, from 1818 to 1868, and the good times coming to the cause of agriculture and mechanic arts, or in other words, the golden age of American industry.

In closing I would express my thanks for the kind attention received. M. F. WATKINS.

HAMPSHIRE.

In discharge of my duty as delegate of the Board of Agriculture, per appointment, I visited the annual exhibition of the Hampshire Agricultural Society, held at Amherst, September 29th and 30th. The weather was all that could have been desired; the concourse of visitors the first day was not large, owing in a great measure to the care being required to secure the second hay crop, which on account of stormy weather, had on most of the valley farms been cut from eight to ten days, and as "he who would make hay must do so while the sun shines," the opportunity so favorably offered this day was gladly accepted by the farming community generally; thus in a measure lessening the interest of the exhibition, although as it was, we report the show as of the first class; in short, a decided success.

The first day was devoted to the reception of articles for the hall, and the examination of farm stock by the various committees.

The stock shown was good in quality and numbers; four towns were represented by teams; in a total, 114 pairs oxen and steers. The centre of attraction of these was on the oxen exhibited by J. Ashcroft, of Hadley, and on the steers shown by Munroe Keith, of Granby, and also by A. Stacy, of Belchertown.

The display of cows was quite meagre and small, and I think there must be many cows in Amherst and vicinity better worthy of premiums than any of those on exhibition.

Of the bulls shown I would mention "Hero," (Jersey,) shown by the Agricultural College, as a superior animal; the "Duke of Hampden," (Durham,) by A. D. Norcross, of Monson, one of the best of the breed in the county. And I would not here pass the Durham recently purchased and shown by W. B. Kymbal, of Enfield, of which I have no hesitancy in saying that he may be made a source of wealth to the farmers of Enfield. The number of herds was limited to two, yet "that which lacked in quantity was made up in quality."

The display of swine was small, but quite commendable.

Of the sheep shown, I would only mention those shown by the Agricultural College; the attention they attracted was well deserved.

Poultry was well represented by many varieties.

In entering the hall I found the exhibition very good, every department seeming to be well filled. The tables of fruits, 626 plates, were literally full to overflowing. Domestic and fancy articles were in their appointed places in abundance. The floral display, arranged by Mrs. Wm. H. Lyman, as well as by Mrs. S. M. Boutwell, was the admiration of all. The many rare and valuable plants by President Clark, of the Agricultural College, added much to fill and adorn the hall.

Agricultural implements and inventions were shown in good numbers. Mowing machines were represented by "Woods" and "Granite State." The improved horse-rake, by E. W. Bullard, of Barre, appears to be practical and must meet with success. The patent wagon hubs, by J. Adams & Sons, of Amherst, made a good show on a new hook and ladder wagon, and also on a team wagon. Though they are at the present a new thing, yet they must in time be appreciated and sought for. I was also interested in Starrett's meat-cutter, by the Athol Manufacturing Company. The whiffletrees and hold-back, by H. Webster, of Cambridge, Vt., "looked well on paper." The ice tools, by F. Gaylord, might here command a passing notice, and if space were given we might speak of Young Brothers' spring beds and bedsteads, corn shellers, hay tedders, &c., all of which commanded their appropriate attention by the visitors in attendance.

The second day was devoted to the display of horses and the annual address, and as at all like shows, brought the crowd. The horses shown appeared to good advantage, and as it is an old saying, "what every one says must be true," this exhibition was a complete success. Not being a competent judge here, would waive all comments.

The annual address, at 2 P. M., by Hon. C. L. Flint, on the "Wastes of Farming," should be read and studied, and even adopted by every farmer of the Commonwealth.

In closing I would not omit to return my thanks to the officers of the society, Mr. Morton, of the Board, President Clark, of the Agricultural College, and Mr. F. Gaylord, of the society, for their kind attention, courtesy and hospitality. E. W. Boise.

HIGHLAND.

The thirteenth annual fair of the Highland Agricultural Society was held on the society's grounds at Middlefield, on the 12th and 13th of September. Though the weather was unpleasant, and the grounds were wet and uninviting, the farmers and their families appeared determined on making the most of their annual festival. The large display of neat stock for which this society has so long had a reputation, renders their fair as truly a "cattle show" as that of any other in the State.

The custom prevailing among the farmers of sending up a herd of cattle to the fair, instead of selecting one or two of the best, we think a good one. One is enabled to see at a glance what the stock of a neighborhood really is, instead of viewing specimens of what it should be. A Mr. Wright exhibited a herd of thirty-five head, besides sheep and horses; Mr. M. F. Watkins a herd of twenty, two horses and two hundred and twenty-five sheep. Besides these there were numerous pens containing from ten to twenty head of cattle, of which their owners may well be proud. All the improved breeds were well represented, although the Short-horns and their grades predominated.

The exhibition in the hall was not large. The butter and cheese looked very nice, and the maple sugar exhibited by Mr. Abbott, of Chester,—a large cake of which was presented to your delegate,—was unsurpassed in quality by any which we have ever seen.

The address, which was delivered by Mr. C. L. Flint, wound up the exercises of the fair. It was listened to with marked attention, by an audience who appeared to appreciate its lessons of wisdom and were ready to profit by its advice.

Before closing this Report, we feel compelled to make a single suggestion. The grounds of this society are located some four or five miles from the railroad, on the summit of a high tract of land, near the small village of Middlefield. In this respect we consider its location peculiarly unfortunate.

Its distance from the railroad, and a want of any regular line of communication between the road and the fair-grounds, prevent hundreds, if not thousands, from attending the exhibition, who would gladly do so were it in this respect more favorably situated. An agricultural society may exist, but cannot prosper, without "material aid." To secure this, regard should be had to its location. It should be easy of access by rail, and within walking distance of some city or large thriving village.

AVERY P. SLADE.

HAMPDEN.

Your delegate to the Hampden County Agricultural Society was on the grounds of Hampden Park the 6th of October, 1868, prepared, by the beauty of the day and the bracing air, to enjoy fully this exhibition. We were struck with the size and convenience of the grounds. Sixty broad level acres along the bank of the Connecticut River, where every arrangement that could be supplied by art is added to fitness of location and richness of soil, to make it a picture of beauty to carry in the mind, and also a comfortable place both for observers and the noble animals that are here to show their grace, make this park the best, for the purposes of an agricultural show, of any in Massachusetts.

At any rate, the sight of it, we think, must induce the farmers who come here to show their stock to make some effort to add beauty and neatness to their homes and retain the conveniences on which every Yankee farmer prides himself. If this park wanted anything, it is a hall where fruit, vegetables and other articles could be exhibited.

The farmers came slowly in with their animals, but when gathered they were well worthy the attention of all interested in pure-bred stock.

We regret to say the number of spectators was small. Though on such extensive grounds, we are aware, even a large number seems few and scattered, we are convinced that the yeomanry and mechanics of this vicinity take too little interest in this fine exhibition. It does not prophesy well for the future. Nay, it is an outlay of effort of a few agriculturists, which is not appreciated, and hence evidence that the farming in Hampden County is not keeping step with the rapid progress of this region in art, manufactures and wealth.

But those who were there were evidently substantial, practical agriculturists, intent on seeing and knowing what was there. The entire absence of loafers and small fry attested to the quality of those present. The reputation of this society for blooded stock was fully sustained.

If we take up in detail some of the chief features of the display of neat stock, the first on the list, for numbers and beauty of form, is the Ayrshires.

Mr. William Birnie exhibited a herd of seven fine heifers, five cows and one bull—all fine specimens. By great care in breeding we should think Mr. B. had succeeded in dropping some of the imperfections of this stock, as apparently he had increased the size of the teats on his cows until they appeared plump and full enough for the convenience of the milker.

Mr. M. S. Kellogg, of Chicopee, also showed twenty-five fine Ayrshires of various ages, sizes and sexes, which were well worthy the marked attention they received.

Other specimens and grades of this breed on the grounds showed that the farmers were profiting by this additional opportunity to improve their cattle.

Mr. Alden Warner also had there a herd of fifteen Herefords, that were remarkable both for uniformity and size. This breed is rarely seen at our fairs. The calves were such exact copies of their parents that we think for matched cattle this breed must afford the farmers much pleasure, and, judging from a grade ox of this blood, presented by the same gentleman, they must be very fine for beef.

Mr. William Mattoon's herd of Devons, fifteen in number, presented all the beauty and compactness of this marked stock. For many purposes of the farm it must be unequalled by any other blood. We are not sure, after the *furore* occasioned by the introduction of other breeds is passed, we shall go back to this as especially adapted to some localities, for dairy purposes and working-oxen.

The Shorthorns were not as numerous in this display as we expected to see. P. Stedman & Son exhibited a fine herd of this blood. We saw evidences of care in breeding from this stock in the fine grade oxen on the grounds.

East Longmeadow showed a fine string of oxen, and among them some yokes of superior animals of this blood.

Feeding Hills also sent seven yoke of extra-sized and trained animals. Among these working cattle there were three pairs of steers of grade Durhams, which weighed in the aggregate five tons thirteen hundred and forty pounds.

Col. J. P. Thompson exhibited four cows of Ayrshire and Durham blood mixed, which were very large and fine; but the beauty and milk record of one of them must, we should think, place her at the head of cows in Massachusetts.

A herd of Jerseys presented by Mr. William Ball, of Chicopee, ten in number, were fair. There were other single animals, but our limits only permit us here to say that, judging from what we saw, the animals for the produce of milk of good quantity and quality are increasing in Hampden County.

Sheep, swine and poultry hardly held a place in this show. One solitary pig was on the ground; but Mr. Mattoon, of Springfield, invited some gentlemen to visit his herd of two hundred in the vicinity.

We also visited City Hall, where the exhibitors presented their vegetables, fruits, flowers and fancy articles. The hall, we understood, was not at liberty until the morning of the 6th, and hence the opportunity for a full display was very limited.

The vegetables, apples and other fruits convinced us that it only wanted *time* and *interest* to make this one of the *best* exhibitions of the kind in the State. Col. Thompson and the Olm brothers had contributed greenhouse-plants and flowers to grace the tables, while sewing-machines, fancy articles and goods of the merchants, and products of the manufacturers, of Springfield, set off the hall in a most attractive form. Our limits compel us to avoid, however, speaking of this part of the exhibition of the Hampden County Agricultural Society farther.

We have only to add that on the 7th we found the exhibition confined to horses. The city of Springfield has always been noted for fine horses. The spirit of the city has evidently infected this part, at least, of Hampden County. Carriage-horses, both single and in pairs, were very fine. We were glad to see that the grace and beauty of this fine animal were not, among the exhibitors, sacrificed to speed for a single mile. As far as we saw, the follies of the horse-trot were also absent from this exhibition. The improvement and growth of the finer qualities of the horse, we feel, should be encouraged by our societies, if it can be done without the immoralities of the turf.

The affability and energy of the officers of this society, together with the kindness of the member of this Board from it, left nothing undone towards making the show fulfil its purposes and give pleasure to its visitors and your delegate.

William Knowlton.

HAMPDEN EAST.

Having been appointed a delegate to the annual exhibition of the Hampden East Agricultural Society, I deem it due to that society, as well as this Board, to apologize for the meagre report I am about to make.

The exhibition was held at Palmer, on the 13th and 14th of October.

Arriving in Boston on the morning of the 13th, but "too late for the (early) train" to Palmer, I reached the town about half past five, P. M., after the close of the exercises of the day. I learned with regret that the agricultural part of the exhibition had transpired, and that the following day was to be devoted to a show of horses, or, to use a familiar and significant phrase, an "agricultural horse trot."

Perhaps I err in applying the term agricultural in this connection, having been informed that the premiums offered were contributed by individuals and not taken from the funds of the society, although any excess over the expenses inured to its use.

Being unable to speak from personal observation of the character of the day's proceedings, I am nevertheless pleased to inform you that, in the opinion of others, it was one of the best collections of stock that has been exhibited at any festival of the society.

The morning of the 14th was ushered in with a chilly east wind and a drizzling rain, interfering materially with the arrangements of the day. Meanwhile I repaired to the vestry of the church, where were exhibited the handiwork of the wife and daughter, as well as the products of the field and garden.

I have witnessed larger displays, but no finer specimens, than some in both departments.

Home-made carpets, bedquilts, nice worsted work, wax wreaths, almost vying with nature in the exquisite workmanship of the flowers—barring the fragrance—fine samples of bread, choice butter and cheese, etc., etc., were among the many articles of utility and beauty in the Home Department.

The collection of fruits hardly compared in variety or excellence with the general character of the exhibition. This may be attributed, in part at least, to the lateness of the season when the fair was held. I think a less number of, and the choicest specimens on plates, would improve the general appearance of the display.

Native wines were exhibited.

As we never allow ourself to indulge in the luxury, fully conceding the wisdom of the sentiment that "wine is a mocker," and that "they who are deceived thereby are not wise," we will presume to offer no opinion as to its comparative merits.

The show of vegetables was ample, and many specimens were of mammoth size and perfect in form.

One gentleman exhibited twenty-four varieties; another, one hundred and fifty varieties of vegetables, grains, seeds, etc.

From the large number of entries of a few individuals, compared with the aggregate collection, we fear that the interest in the society may not be so generally diffused through the community as to secure the most beneficial results to the cause of agriculture.

Several boxes of cigars were shown.

In the verdancy of our youth, we attempted to arrive at maturity by a speedy process. Discarding Father Time as altogether too slow for our purpose, we took a cigar, believing that its magical influence would transform us at once into the full stature of manhood. But soon a "change came o'er the spirit of our dream," and eschewing the agent, we were pleased to stoop from our high aspirations and take the most lowly position Dame Earth vouchsafed to us. We have never repeated the experiment, but from observation are fully convinced that the cabbage leaf is intrinsically more valuable than the tobacco leaf, unless for the destruction of vermin.

At ten o'clock, the weather appearing more favorable, the marshals with a band of music entered the grounds of the society, preparatory to the exercises of the day. A class of horses was called for; two appeared and passed around the track. Very few persons were present.

Believing, from the best evidence we could obtain, that the show for that day must prove a failure, we took leave of our Palmer friends, and embarked in the mid-day train *en route* for the Old Colony. GEO. M. BAKER.

UNION.

The second annual fair and cattle show of the Union Agricultural Society was held on the 16th and 17th of September. The first day was very unfavorable; the morning was dark and lowery, and it commenced raining about nine o'clock and poured down in torrents most of the day, clearing off at night. It was followed by a cold, windy day, and the ground being very damp, made it quite unpleasant being out, so that the attendance was not large. Blandford is pleasantly situated on the top of the mountain, some 1,700 feet above the level of the sea.

Athough the weather was so unfavorable, there was a very good show of cattle the first day. About seventy yoke of oxen and steers, some fine cows and heifers, were on the ground. I was disappointed in not seeing any sheep. I had supposed I should see a fine show of sheep up among the hills. The show of swine was small. The cattle were mostly Durham and grade Durham. L. C. Nye had three pairs full-blood Shorthorns which took the first premium. D. and R. Nye had a number of yokes grade Durhams, very fine. Amos Hall exhibited one pair three year olds, weighing

3,000 lbs. E. J. Combs, of Russell, had some fine heifers. Joseph Cross and Clark Haley had each a pair of fine workers. There were two Durham bulls on the ground, very good animals, one belonging to E. W. Boise. The second day was the show of horses, which was very good. A fine stock horse was exhibited by F. C. Knox, a Black Hawk stallion by F. T. More, of Tolland, and some fine colts by C. O. Perkins, Becket.

Having no hall, they erected a tent on the ground, which was a frail building for a rainy day. The show of butter and cheese was very good. The show of fruit was not large. Some fine specimens of apples were noticed. The exhibition of needle-work bore witness of the industry and skill of the ladies.

In the organization and management of this young society, with due deference to its present able officers, I venture to suggest some alterations. First, the procuring a suitable building for a hall, to be erected on the grounds. This, however, I understand, is in a fair way of being accomplished. Second, let the show of cattle and the address occupy the first day, and the show of horses and the public dinner the second. I say public dinner, for this setting down at leisure at the same board is one of the strongest ties of social intercourse, and in order to make the influence of the hour what it should be, let woman grace the festive occasion with her presence. Let me assure the good people of Blandford, if they will adopt this plan of a public dinner on the afternoon of the last day of the fair, with some pleasant speeches at the close, it will tend much to increase the interest in the occasion, as well as help to strengthen the tie of brotherhood which ought always to exist among the members of an agricultural society. A third suggestion is a greater division of labor in the management of fairs. I think the society should have a large committee besides its present board of officers. This committee should be composed of working men, selected from different parts of the society, whose duty it shall be to use their influence in getting the farmers out with what they have to show, while on fair days, each should have his department assigned him, and make it his special duty to attend to all its details.

In closing this Report, I would express my gratitude for the kind and hospitable manner in which I was received by the officers of the society, and especially my thanks are due to the family where I found such a pleasant and cheerful home.

John A. Morton.

FRANKLIN.

Having been appointed to attend the fair of the Franklin County Agricultural Society for the year 1868, I performed that duty, and submit the following Report: —

The first day of the exhibition was a very favorable one, but the inclemency of the weather on the second day greatly interfered with the portion of the fair that was assigned for that time. The display observed by your delegate was very excellent. The number of entries in the department of neat stock was very large. A great proportion of the animals were grade Shorthorns, and it would be very difficult to find anywhere a finer exhibition of that kind of stock. The show of sheep, swine and poultry was very creditable to the farmers of Franklin County.

Among the articles displayed inside the hall were several carpets of domestic manufacture, which exhibited great skill in that kind of work. There were also some beautiful specimens of table cutlery, which came from two cutlery establishments in Franklin County, which are the largest of the kind in the United States. On account of the unfavorable weather, as already stated, your delegate was not able to observe the manner in which the officers of the society conducted its affairs as fully as he would have been glad to do. So far, however, as he was able to see, they were carried on with order and method and vigorous enterprise. Your delegate is under obligations to members of the society for very kind and courteous attention. Geo. A. King.

BERKSHIRE.

As delegate of the State Board of Agriculture, and agreeably to my appointment, I attended the fifty-ninth annual exhibition of the Berkshire Agricultural Society, on the 6th, 7th and 8th of October, at Pittsfield.

The first day of the fair the show of cattle was very large; the Alderneys or Jerseys, Ayrshires, Durhams, and Devons were of superior quality; and also many of the grades. There was a very large exhibition of sheep, and some of the best I have ever seen. Swine and poultry were fully represented. The show in the hall, of butter, cheese, bread, honey, grain and vegetables of every variety, paintings and works of art, household manufactures, and the floral department were creditable to the ladies and others who were instrumental in fitting up the hall, as well as to the producers.

The second day was the show of horses and colts; some of which were superior; and the ploughing match, which was attended with considerable interest, and the ploughing was very well done.

The third day, the first thing in order was the address, by Richard Goodman, Esq., president of the society; which was listened to for more than an hour with uncommon interest, and was the better for being a home production.

The awards of the several committees were then read, and the premiums delivered, mostly in plate, to the amount of nearly $1,800, to the successful competitors. The payment of premiums in something of this kind as a keepsake, I think, far preferable to a few dollars in money, which often take to themselves wings and fly away.

This ancient and honorable society, with 900 members, paid out in premiums at the show, in cash and plate, more than $2,200; and after paying its other expenses, has a balance in the treasury of more than $3,200; and with its efficient board of officers, is in a sound and healthy condition. They have ample grounds, fitted by nature for the purpose, with a good track for the exhibition of horses; and I am happy to say the society for the coming year offer no extra premium for fast horses.

I would suggest that less money paid in premiums and more for printing information through its Transactions would vastly increase the influence and value of the society. In no way can a society fulfil its mission so efficiently, or do so much good as by distributing able and instructive reports among the people.

Their hall is sufficient for purposes of exhibition, but they have no hall, (as most younger societies have), where members and others with their wives and children, can gather around the social dinner table; yet there were ample provisions for the inner man in a part of the hall building and on the grounds. I shall ever remember the hospitality, the courtesy and attention I received from the officers of the society and others, during my three days of cattle show acquaintance; for which, they have my hearty thanks.

Thomas Billings.

HOOSAC VALLEY.

It was my good fortune to be present at the ninth annual fair of the Hoosac Valley Society, held at North Adams, September 22d, 23d, and 24th, and in the absence of the regular delegate of the Board, submit the following Report by special request:—

This society is still in its youth, but there is a zeal among its members that gives it the vigor of age. The exhibition grounds are located amidst the finest scenery in Massachusetts. We were reminded, as we looked upon the cloud-capped mountains around us, of the expression of David in reference to the site of Jerusalem, "Beautiful for situation." Graylock raises its towering head in the south, and on all sides the lofty peaks of the Hoosac mountains are to be seen.

The Hoosac Valley, at North Adams, is narrow, and a stranger passing through the village might well wonder where the agricultural productions could be raised to furnish an exhibition. Towards South Adams, and more especially towards Williamstown, the valley expands, furnishing some of the best arable land in the State. The Green River also joins the Hoosac from the south at Williamstown, furnishing much excellent alluvial soil. Certain it is that agricultural productions were not wanting to make a fine show, though, owing to the unfavorable weather, the display was not equal to some former years. We learned from the secretary that there were entered for premiums among the field crops, 27 pieces of corn, 19 of potatoes, 16 of oats, apple orchards, 11, gardens, 8. Of domestic animals on exhibition, there were 5 pairs of oxen, 18 cows, 7 bulls, 3 herds, matched horses, 13, single horses, 13, and trotting horses, 7. The amount of premiums offered was $1,431.50. In the hall we found 97 different articles of household manufacture, 29 lots of fruit, all excellent; 23 entries of garden vegetables, 28 paintings and works of art, and 12 lots of butter and cheese.

We were glad to notice that the horse did not override all other farm stock. Of the $560 premiums offered for stock, the horse received only $131 ; not an unreasonable proportion.

We were disappointed in the reports of the committees of examination and award, not to hear any valuable suggestions. These committees, as they examine the various field crops, the domestic animals, and agricultural productions and implements, cannot fail to acquire much useful information, and this they are in duty bound to communicate to others. We respectfully suggest to the officers of the Hoosac Society that they offer premiums for the best reports, so that their "Transactions" may be a source of knowledge. The committee that goes around the county viewing the different farms and the various modes of culture, have a rare school for learning the practice of the best farmers. No one can serve on this committee without increasing in knowledge, and this he should be willing to share with others, for giving knowledge does not impoverish the giver.

The officers will also pardon us for making one more suggestion, and this is, that the audience-room be furnished with seats, so that more order may be observed during the delivery of the address and the reading of the reports. If the hawkers' stands were a little further removed from the hall it would also conduce to more quietness. Sheriff Root is as efficient a marshal as can be found for such an occasion; but men have too much locomotion in them to keep quiet for an hour unless seated.

The Hoosac Society has an able corps of officers, and to them we are indebted for many civilities, and in the delightful family of Mr. Sylvander Johnson we found generous hospitality.

Alexander Hyde.

NORFOLK COUNTY.

The twentieth annual exhibition of the Norfolk County Agricultural Society was held at Dedham, on Thursday and Friday, September 17th and 18th. As delegate from this Board, I was on the ground on the morning of the first day, and remained till near the close of the fair; and examined the stock upon the grounds of the society, and the products of the farm and garden, and the various implements of husbandry, in and about the hall, and can pronounce the show a good one.

The first day was devoted largely to the reception and arranging of stock on the grounds, and the various articles in and about the hall. The show of fruit was very fine, although the crop in that part of the State was not abundant.

Col. Wilder, the president of the society, had on exhibition over one hundred varieties of pears, from an orchard that any one would be well paid for visiting. I might mention a long list of others who had a fine display of fruit. But without mentioning names, I will say the show in this department was excellent. The collection of flowers was beyond anything I have ever witnessed in this department, showing that some attention has been given to the beautiful as well as the more substantial.

The handiwork of the ladies, in the useful as well as ornamental, attracted much attention, and was very creditable to the contributors. Agricultural implements were largely exhibited. The demand for the best tools and machinery is increasing so rapidly that those dealing in these articles are anxious to exhibit their wares, and take this method to advertise them.

The ploughing match took place on the afternoon of the first day. The larger part of the work was done with horses, and I should judge, from the small number of oxen on exhibition, that farm-work in that vicinity was to a great extent done with horses. This is a very important part of the preparation for successful cultivation. If good ploughs are not used, and the work of ploughing well done, the labor of cultivation is greatly increased.

The show of stock was said to be far in advance of former years. There were nearly two hundred animals on the ground, mostly cows and herds of cattle. Although this is not so great a dairy section as the interior and western part of the State, still there were many fine cows to be seen. Among them were Ayrshires, Durhams, Jerseys, and what seemed to be a distinct breed called the Jamestown. These were of large size, and without horns. I should judge that Norfolk County gives but very little attention to sheep husbandry, as there was but one lot on the ground, and those not of remarkable quality, although the exhibitor took two premiums, one of five and one of ten dollars.

In the department of swine the show was also quite small. I noticed a few of the Chester County breed that were very fine. If the interest manifested at the fair is a fair index of what is done with sheep and swine in Norfolk County, there is little danger of our markets being overstocked with wool, mutton or pork from that section.

The exhibition of horses was very fine. I noticed several owned by Col. Russell, of West Roxbury, that attracted much attention.

Particular interest is manifested in the social part of the entertainment. A large procession of gentlemen and ladies was formed and marched to the hall, where a bountiful repast was provided. After doing ample justice to the bounties upon the table, Col. Wilder, the president, made a brief speech, in which he congratulated them upon their former as well as present success, and, after thanking the members of the society for keeping him so long at its head, requested them to excuse him from his responsible position, and elect some one else as their standard-bearer. But, from the feeling manifested, I think it would be hard for him to get the harness off.

The regular address was delivered by James W. Thompson, of Jamaica Plain, upon topics connected with agriculture, which was listened to with marked attention; after which others followed with shorter speeches, rendering the exercise highly satisfactory. My visit was rendered particularly pleasant by the kind attentions of the officers and others while at Dedham.

Newton S. Hubbard.

HINGHAM.

As delegate from the State Board of Agriculture, I attended the annual exhibition of the Hingham Agricultural and Horticultural Society, on the 29th and 30th of September, 1868.

With his usual urbanity, the president of the society met me on my arrival at the grounds of the society, and his kindness was unabated till the last glimmer of the fading light of the last day of the tenth exhibition of the society over which he so acceptably presides.

Mr. French, the treasurer of the society, also gave me the right hand, fellowshipping me as a brother farmer. He was unwearied in his efforts to make my time pass pleasantly, and he succeeded to charm.

The God of love smiled on the labors of the community encircling the membership of this society. In their former exhibitions they have been in a high degree successful, but in this last they may glory.

Though they reckon ten years of existence, they count but two years since their adoption into the family of societies. Yet, with its youthful vigor, it has been able to present to the State a growth which many societies venerable in years must acknowledge as their superior—a growth of zeal, of power, and of worth to the world.

The society's building stands upon their own ground, well located and capacious. The lower story is used for the horticultural exhibitions, in which was a splendid display of vegetables, flowers and fruits.

On exhibition were five hundred plates of apples of almost every variety and of superb beauty; three hundred and fifteen plates of pears, excelling in variety and general appearance similar exhibitions from a much larger extent of territory.

There were one hundred and thirty-four plates of grapes, representing every variety usually cultivated, and in clusters of surpassing magnitude. In this department the connoisseur would feast on nectar fruit and wisely judge, while the unskilled might eat to satiety and fail to make the proper distinction.

The roots spoke well for the soil of Hingham and its vicinity, as well as for its cultivation.

On exhibition was a specimen of every variety of grain grown in that section, showing that the husbandmen of that society do not mean to be outdone in variety, more than in quality.

These specimens gave evidence of a fruitful season, and the pumpkins and squashes predicted the feeling of the heart, which no doubt was substantially manifested on the last Thursday in November.

To give everything that was in the hall a particular notice is not the object of this report. Time would fail, and the effort would fall far short of merit.

I may be permitted to say that the wives and daughters no less deserve notice for the exhibition of articles of fancy and other needle-work, for the arrangement of flowers with which the hall was so beautifully decorated, for the taste displayed in all their efforts, than do the husbands and sons for the grosser part of the show in the hall.

As a curiosity and evidence of skill, there were two pails on exhibition, made in Hingham. In one of them were *ten thousand* pieces of wood, of various colors; the other, made by the same man, did not contain quite so many pieces, but, as well as the first named, was a superb pail, holding ten quarts.

There was almost everything, as well as everybody, in the hall. Pleasing objects, bright eyes, pleasant countenances and merry hearts. There, too, was the infant's couch, neatly arranged and tastefully adorned, indicating quiet repose. And near by was the monumental stone, to note the last resting-place of some dear friend, so neatly carved as to incline the passer-by to pause and let dust return to dust, while the spirit soared on angel's wings to rest on high.

The second story of the building is designed as a place in which to invigorate man, both mentally and physically.

A mental feast had been prepared, and at 12, M., on the first day, all were invited to repair to the hall and partake. The hall was well filled. The president introduced Charles L. Flint, Esq., of Boston, as orator.

Mr. Chairman, if Mr. Flint were not present I would say: Knowing Mr. Flint's tact, we were anticipating a rich treat; but were not looking for an address so much out of the common course on such occasions.

The speaker entered directly into the interest of those to whom he was speaking—a company of farmers. His object seemed to be to profit the understanding as well as to please the ear of his hearers—to convince them of the necessity of every farmer making some crop a specialty in his operations. First find what crop is best adapted to his farm, and then attend to that crop; devote his energies to *it*, rather than to the *many*. He urged that farming is not now as it was in the days of our fathers, who lived principally on the products of their own farms, finding in them both the comforts and the necessaries of life. People have changed in their habits of living, and necessity compels them to change the manner of obtaining it.

It was evident that the audience sat under the hearing of the speaker with marked satisfaction, and with unquestionable profit. The whole was a most capital affair.

But, sir, as Mr. Flint is present, I will say nothing about it.

I did not arrive in season to witness the ploughing, but the ground ploughed gave evidence of the skill of Hingham ploughmen.

One and two-horse mowing-machines were put into grass of second growth. Each machine worked well, and the drivers appeared to know what they were about. To say which machine did the best work would be giving an opinion unasked.

Three hay-tedders were brought to the field. The American tedder was silent in its operation, and endangered neither life nor limb of man or beast.

The Barnard tedder is a most capital implement in a field infested with bees; neither horse nor driver will afford a lighting place for that most troublesome creature.

The hay being flung forward instead of back, the air was completely filled, not only about the team, but high up, giving the wind an opportunity to play with it, as it did, much to the amusement of the bystanders.

The grasshopper-tedder made a novel appearance, kicking, or rather scratching, the hay back with a flirt. It is a capital machine to follow the other two, especially in bee-infested fields. The American will stir up the bees, the Barnard will keep them from man and beast, and the grasshopper will kick them out of the field.

Three horse-rakes were brought to the field, in the trial of which each gave evidence of its utility.

The mower, the tedder and the rake are great labor-saving machines; and although their cost seems to be enormous, yet, at the present cost of labor, the farmer will find his account in using them—all if he can, one if he may.

The stock-pens were well filled—some with cattle, some with sheep, and some with swine. The exhibition in this department was by no means inferior. Most of the thoroughbred stock was of the Jersey breed. Many remarkably good specimens were exhibited; some of recent importation by the president of the society.

A large number of sheep were on exhibition. They were of superior quality, both of grade and full-blood Southdowns.

The swine were mostly of the Chester County breed, and they gave evidence of good keep.

Your delegate does not suppose that the Massachusetts State Board of Agriculture sent him to Hingham to exercise that discrimination, at the fair of that society, that might be required of him who was to award a premium in dollars and cents, or to recommend a gold medal, to him whose stock should excel, but rather to give a general outline history of the doings of the day; yet I may be allowed to say that if any one wishes a pure-blood animal, either of cattle, or sheep, or swine, the president of that society can accommodate him, as also can other members of the society.

The grounds of the society are ample—sufficient for all necessary purposes of the society. It is a very desirable spot for the use to which it has been put. There is sufficient variety of soil to enable the society to perform their ploughing and mowing on their own premises. An eminence being about midway of the grounds, affords a standing-place for hundreds, if not for thousands, of spectators, where they may remain in quiet and view all that goes on around them.

Being allowed a place on the judges' stand,—not for the purpose of forming an opinion that should affect the opinion of any other man,—one of the most beautiful sights of the day was that of perhaps a thousand people, men, women and children, standing and sitting upon that elevated spot, with none to molest or make them afraid.

On the one-third mile track which is on the society's grounds were exhibited some well-matched horses, driven by their owners; also some single teams, which it will be difficult to excel either in general appearance or elegance in style. This track is by no means a race-course. The pure-minded people of Hingham and its vicinity detest gambling in all its forms. Thinking that the card-table, the cock-fight and the horse-race form a trio to be disapproved in its parts, as well as in the whole, they do not allow the one nor the other to disgrace the track nor corrupt the morals of the society that formed it.

To this fact, in part, may be attributed the order—the most perfect order—that prevailed during the two days of exhibition. Distinguished gentlemen and fashionable ladies could promenade on those grounds without fear of insult from that class of men who usually accompany the race-horse when he is to be put upon the track. This society, in the opinion of your delegate, has adopted the right course in regard to the horse and his service. May other societies profit by the example.

Weston, the far-famed pedestrian, first witnessed the exhibition in its varied parts, and then put himself on exhibition; but without the expectation of a premium, because he had no competitor. He proposed to walk five miles inside of one hour; one-third of one of the miles he would walk backwards. This being a prominent section in the programme, the whole multitude came together. The track was lined and the hillside covered with people. Had he been so disposed, there was no opportunity for poor Weston to escape, for the crowd and the marshals were on hand.

All things being ready, Weston obeyed the signal, "Go." He moved, but not with great rapidity the first round; but soon increased his speed. The third mile he walked in nine minutes, when he felt himself in time. One-third of the fifth mile he walked backwards, and completed the whole distance of five miles in fifty-six minutes and a few seconds. This ended the exhibition.

Curiosity having been satisfied, and the physical man wearied, the society and guests were invited to the hall, where a most sumptuous dinner had been laid. This part of the exhibition was in perfect keeping with that from which we had just retired, after two days of exciting, though pleasant, and we hope profitable, labor.

Most of those who witnessed the out-door exhibition were *spectators*, *lookers-on*, and were interested in a great degree in what *others* were doing. But at the table it was not so: every one was interested in his own labor, and strove to excel his neighbor. If this principle were carried into all our industrial habits, what a revolution would be wrought in the welfare of our community!

There were some good speeches made, and some poems well adapted to the occasion read, which, together with the fine vocal and instrumental music, served as a second intellectual feast.

And now may I be allowed to say that these occasions, these exhibitions, should not pass without some good result other than the "good time" had by those who attended them. A lesson should be received from which lasting good may be derived, not only by those who were present, but by all who may compare the doings of one society with those of another. Comparison should incite emulation, and where ardor has been kindled by the praiseworthy example of another, success in some good degree is sure to follow. Let individuals set their standard high, and on such occasions as we report bring the result of their efforts, telling the story of their labors, and many will go and do likewise, if not much better. By such means the great object of this Board, and the design for which these societies were established, to wit, the improvement in farm and garden husbandry, as well as the improvement in farm stock, will be accomplished.

We believe that the Agricultural Society of Hingham and vicinity is on the right track, and as long as it so continues success will attend its efforts. THOMAS W. WARD.

BRISTOL.

The three fair days of the Bristol County Agricultural Society, for the year 1868, seemed devoted to amusement by nearly the entire community, giving your delegate a very enlarged idea of what may constitute a farmers' holiday.

This being the forty-fifth anniversary, and the largest, and the most successful fair ever held by the society, and witnessing the extinction also of their entire debt, with a property on hand of the net value of thirty thousand dollars, might well be an occasion of rejoicing.

The grounds on the second day were visited by twenty thousand people, and the receipts for the three days of the fair were eight thousand five hundred dollars. Six thousand five hundred dollars have been donated to the society in sums varying from one to over five hundred dollars each; and twenty-five hundred dollars are acknowledged in the last year's account as donations. The society has voted, to the individuals making these donations, especial privileges and the honors of the society.

A few facts and figures, giving a general idea of the manner of cattle show at Taunton, must suffice, rather than particulars where so much of excellence abounds.

Although the average of the cattle was not so large as in some parts of the State, yet there were numbers of large and extra sized animals; showing what might be done by many more of the farmers of this part of the State. Town teams made a prominent part of the exhibition. By actual count there were two hundred and forty-two oxen and steers in one string; they were from four towns, and headed by the Taunton National Band, were driven around the track.

The ploughing match was a grand display; twenty-four teams, with as many ploughmen, entered, and contested for the eight prizes. That this noble interest and competition may be fully sustained in the future, your delegate would suggest, as did the committee, that more premiums in the future be at their disposal.

The spacious hall, covering the entire floor of the second story of the society's building, 100 by 150 feet, was fully filled with the products of agriculture and art. Manufactures of cottons, woollens silver, brass, iron, steel, leather, and wood, were all prominent in the exhibition, and are large interests in this part of the State. In fact the farmers and mechanics seemed to vie with each other to see which should exceed and excel. Eight premiums were awarded to as many individuals, as exhibitors of honey-bees and honey; there was literally a pyramid of boxes of honey, sufficient to load a team.

The programme indicated great variety, adapted to suit the varied tastes of all; and the weather being all that could be desired, it was literally carried out to the gratification of all concerned. The large collection of cattle, horses, sheep, swine and fowls, remained on the ground during most part of two days; the society's barns supplying the necessary shelter and feed for horses and other animals. The manner in which the large supply of water, requisite on such an occasion, was supplied, demands a passing explanation. A day or two before the fair, a man, whose regular business it was, was employed to drive with sledge hammer into the ground, in several places, conveniently located, galvanized iron tubes. These tubes were provided with a properly sharpened and guarded point at the end intended to penetrate the earth, and about two feet of this lower end was perforated with small holes to act as a filter to the water. It was driven into the ground about twenty feet, and a pump attached to the tube. The well, for thus it must be called, was thus complete, and furnished an almost constant stream of water during the day.

More than eighty tents and temporary buildings were counted; they were so arranged as to form a continuous street for considerable distance.

The society's dinner was provided on the second day in the third story of the hall; and its ample provisions were enjoyed by more than eight hundred guests. After which, Hon. Oliver Ames, of Easton, president of the society, introduced the Hon. Horace Greeley, of New York, as the orator of the day. The subject was agricultural progress, and was eminently practical and instructive.

The complete marshal and police arrangements were worthy of much praise, as they were a great credit to those who had them in charge. Not a drunken or disorderly person was noticed by your delegate during the two days.

With much satisfaction I here record my thanks for the many attentions and efforts to make my visit pleasant, both by my fellow-member of the board from Somerset, and by all the officers of the society and others.

C. Sanderson.

BRISTOL CENTRAL.

Agreeably to appointment, I attended the annual cattle show and fair of the Bristol Central Agricultural Society, held at Myrick's on the 17th and 18th of September.

No one on entering these spacious and beautiful show grounds can fail to be impressed by the substantial and permanent character of all its appointments. The hall is a symmetrical stone building of ample dimensions, two stories high, and seems admirably adapted to the purpose for which it was designed.

The show of cattle was not large, but most of the improved breeds were represented by animals that would have attracted attention at any exhibition. The four year old matched grade Shorthorn steers, shown by Jonathan Slade, of Somerset, are seldom equalled. Dr. Durfee and Wm. Slade also contributed splendid animals in this class. The exhibition of working oxen was good, and the arrangements for trying their strength and training were well worthy of imitation; sufficient space being enclosed to keep back the crowd, and no one admitted within but the judges and drivers.

Sheep were few, but very good; we noticed but one lot of Southdowns. It is to be regretted that this very useful animal is not more generally kept by the farmers of the State, to the extent at least of supplying meat for their own tables. We can personally testify to the great convenience and economy of having constantly on hand a good fat Southdown sheep or lamb for home consumption.

There was a fine exhibition of breeding mares and colts, showing both care and skill in their breeding. The trotters were not forgotten, and judging from the crowds constantly surrounding the track, they were receiving their full share of attention.

In the hall there was a fine display of the products of the orchard and garden, as well as of the handiwork of the ladies. We noticed a beautiful sample of white Michigan winter wheat, plump and fair, grown by E. Wing, of New Bedford, with a yield of twenty-five bushels per acre; also a sample in the straw, by Cook Borden, of Fall River. When wheat of this quality and yield can be profitably grown in Massachusetts, surely we ought not to be so entirely dependent on the West for our supply of flour. The exhibition of hot-house grapes, peaches, pine-apples, and flowers, contributed by Dr. Durfee, was perfectly splendid.

The attendance of people was very great, especially on the second day, and seemed to be largely composed of the farmers of the county, who came with their own carriages, bringing their wives and children, all entering into the spirit of the occasion with great zeal and animation. The spacious dining-hall was filled to overflowing at the annual dinner, which came off on the second day; but we regret to be obliged to report, that as usual on similar occasions, the after-dinner speeches were not made, as they ought to be, by the farmers themselves; but the good time is not distant when we shall have liberally educated farmers within the limits of every county society, who will be equal to every demand made upon them, not excepting that of agricultural orator at the annual dinner.

We desire to express our obligations to the public-spirited president of the society, Dr. Durfee, for courteous attention and entertainment, and the pleasure received in examining his extensive grape and peach houses; so fine a crop of peaches under glass we never saw before; we can also bear witness to their most excellent quality.

Wm. Birnie.

PLYMOUTH.

According to appointment, I attended the cattle show and fair at Bridgewater, it being the forty-ninth exhibition of the agricultural society in the county of Plymouth.

On account of the weather the first day, which was very unpleasant, although not very stormy, the number of people in attendance was not as large as was anticipated. At an early hour the cattle were in their places, and were said by those who knew, to be the best ever seen there. However that may be, the show was a good one. Some very fine oxen—a few beef cattle—that were extra. The Ayrshire stock was well represented, but larger by far was the show of Jersey. Some herds were very fine. In this locality the Jerseys are taking the lead for dairy purposes, and judging from some very nice butter on exhibition in the hall—produced from the herd of their president, Mr. Davis—I think they will continue to do so where only dairy qualities are wanted. They would be worthless for stock-raising in many parts of the State.

There were very few sheep on the ground, and those of but fair quality.

Of swine there were some very fine specimens.

The show of working oxen was good. Their trial drew a large crowd of people. As usual at these trials, there was a diversity of modes used to get the most out of the teams. Some did it by loud talk, and some by the application of the whip. The latter mode, I think, should be looked after by the "Society for the Prevention of Cruelty to Animals." When the oxen are doing their best, then it is that the lash comes. I sometimes wish that the drivers could change places with their teams, and for once take the whippings they so perseveringly administer to their faithful beasts. I believe the least talk, and by all means the least whipping, to be the best way to get the most out of a pair of oxen.

The ploughing match took place on the grounds of the society, and was entered into with energy and skill, the work being performed in good shape.

The weather on the second day was exceedingly stormy, and of course prevented much of the horse show. The trotting was postponed until the next day, and as I was obliged to leave, I did not see it. There were some very nice horses exhibited, and with favorable weather they would have made a fine display.

The show of vegetables and fruit was good—the vegetables, extra. I think I never saw better.

The display of handiwork by the ladies, in articles both useful and ornamental, was superb. Nor was their skill all exhausted on fancy work. Their bread, butter and cheese made so fine an exhibition, that few would dare to compete with them. This is as it should be. Let us strive to make our annual fairs so interesting that our ladies shall be constrained to leave their common round of home duties, from which too many of them seldom get reprieve, and by their presence encourage husbands and brothers, as well as exhibit their own skill and workmanship. I think a wholesome emulation might be excited between the sexes, as to which of them shall bear away the palm from our annual exhibitions.

H. S. PORTER.

MARSHFIELD.

The 1st and 2d days of October, 1868, will not, I trust, soon be forgotten by the writer, and for reasons herein narrated.

In accordance with the requirements of law, the "Marshfield Fair" was held on those days. We arrived on the grounds at half past ten o'clock. The clouds portended rain, yet the ardor of no one seemed dampened, and the grounds presented a lively scene. Various amusements had been provided, which the young folks greatly enjoyed, and which the older and more sedate of those present regarded with much complacency. The concourse of people, however, was not so large as in any manner to impede our progress in making examinations and investigation into the great variety of articles and animals on exhibition.

Before proceeding thus, we of course paid our respects to President Baker, who was actively engaged in the discharge of his duties on the occasion.

With some friends of agriculture whom the president introduced, we proceeded to the hall where the fruits, flowers, fancy articles, products of the dairy, pickles, jellies, bread and honey were shown, and found said hall packed to its utmost capacity with things usual, and possibly some which were less common on such occasions, the fruit, and so forth, comparing favorably with what we had witnessed at other places. Owing to the small size of the hall, room therein for the display of vegetables was not available; hence, a passage through the wall had been made, a tent thrown up, under which the potatoes, squashes, beets, turnips and others of the vegetable tribe were arranged, together with a portion of the fruit. The specimens shown were creditable to the producers.

In some instances, however, the exhibitor made the slight mistake of exposing his largest specimens, without regard to form or quality. Enormously large roots or tubers are not generally palatable to bipeds, even with the usual condiments. They may do to cut up for cattle or swine, but quickly grown, medium sized, clean and smooth specimens are vastly preferable for culinary purposes.

From the hall and tent connected, we wended our way to the cattle pens, which were rapidly being filled. We saw good specimens of Jersey and Ayrshire and Devon stock, though we believe no remarkable claims were set up in favor of individuals. The native stock, too, looked well. Indeed, the cattle consisted of just such specimens as one would expect to meet, who is familiar with the soil of Marshfield and adjoining towns. We think Shorthorns would fare but poorly in the pastures in that locality, which, as we judge, the farmers there fully understand. A goodly number of mares and colts were on the ground, some of which were very fine.

Immediately after dinner, on the first day, an instructive address by Dr. Loring, in the large tent, was listened to by an interested audience, after which things moved on in the natural channel till night set in, closing up the business of the day, when we found ourself quite unresistingly conveyed to the residence of John H. Bourne, where we were hospitably entertained till the exercises of the second day opened, which was quite early.

In company with the family of Mr. Bourne, at an early hour our face was set towards the fair ground, on approaching which, our advances were much retarded by the immense blockading squadron collected in proximity with the exhibition. We finally reached the desired locality without serious accident.

There was a track within the inclosure, and numerous were the colts exercised thereon, but no *racing* properly so called. We had before seen what people termed string teams, consisting of fifteen to thirty yokes of oxen, but never before saw one hundred and seven pairs of oxen in one string. Why, a few more would have closed up the gap in the half mile track. None of the cattle could be regarded as remarkable for size, and few of them for beauty or the amount of fat covering the muscles, yet, in the main, they were good, substantial working oxen.

The exhibitors, we judged, were nearly all of them practical farmers, who maintain families directly from the products of their own labor on the soil—men who have the substance of things hoped for, but whose greenbacks are not so plenty that the surplus may be expended as *fancy* alone shall dictate.

Every man, woman and child seemed desirous of helping along the exhibition. No disposition was manifested to reach the ground by climbing fences, or by mining, such as we have witnessed in another locality. So orderly was the assembled multitude that the State Constables had only to move round and enjoy themselves with others.

Now for the results of such an exhibition.

1st. The society cleared, after paying all expenses, $1,250.

2d. That sum has encouraged the members to proceed with measures for securing a larger exhibition hall, of which they greatly stand in need.

3d. The people have enjoyed two days of relaxation from toil, and been improved in their social feelings.

4th. A spirit of generous emulation was aroused in the minds of contributors, which will cause them to put forth greater exertion in the line of improvement.

5th. Thousands withdrew from the Marshfield Fair near the close of the 2d day of October, 1868, with this idea fastened permanently and indelibly in their minds; viz., farmers' fairs, cattle shows, are institutions which should not be overlooked or neglected, because the temptations to vice are kept in abeyance, or, rather, not permitted to approach, while the better feelings of our natures are stimulated to more activity in a direction which cannot be otherwise than improving.

We look forward in anticipation of most beneficial and happy results to the people of Marshfield and surrounding towns arising from their agricultural and horticultural exhibitions.

To the officers of the society, John H. Bourne, and others, our acknowledgments are due, and most cheerfully tendered, for courteous attentions during our visit at the fair.

Asa Clement.

BARNSTABLE.

We had the pleasure of attending the annual fair of this society in Barnstable, Tuesday and Wednesday, October 13th and 14th. We have a little Cape Cod blood flowing in our veins, and felt not a little interest in visiting the home of our maternal ancestors, and noticing the condition of agriculture and the state of society in the oldest portion of the State. A traveller in the cars over the fine plains of the Cape may wonder where the inhabitants get their bread and butter, for the land does not look as though it could raise breadstuffs or support a cow. A companion in the cars remarked, "I should hate to own all this land and pay taxes upon it;" and again, "The Cape Coders must live upon fish, salt, and cranberry sauce." We had been in the region before, and knew from experience that there were no better livers, nor a more hospitable people in any part of the country. The land is indeed poor, but skill and industry are sure of making a living anywhere. The weather on the first day of the exhibition was all that could be desired, and the show of stock, though not equal to that in some other parts of the State, was still very creditable. Jersey cattle are apparently the favorites on the Cape, probably from the fact that their little bodies do not require much forage, an article not quite so abundant here as in the Connecticut Valley. Mr. Francis Bacon exhibited a superior bull, two cows, two heifers, and several calves of this breed. Mr. Bacon was also a large contributor in nearly every department, and did much to make the fair a success; opening the doors of his mansion in elegant hospitality to the old and substantial farmers of the county. If our car friend could have seen his table he would have altered his opinion about the inhabitants of the Cape living upon fish and salt. Mr. Bacon well illustrates the propensity of the inhabitants of the Cape to remain upon the old homestead, as he represents the ninth generation that has occupied the Bacon farm.

Stephen Smith, of Barnstable, was also a large contributor to the stock department, showing some fine Jersey and Ayrshire cattle. The Devons were represented in the herd of Nathan Edson, who also displayed some choice pears and grapes. His Black Hamburgs are seldom excelled. The fruit department was much indebted to the display made by Warren Marston. Cranberries of course were the leading fruit, and we never saw finer specimens. Cape Cod has greatly the advantage over other sections of the State in the cultivation of this delicious and healthy fruit, being exempt, by close contiguity to the ocean on both sides, from late frosts in the spring and early frosts in the fall. At the time of our visit, about the middle of October, the cranberries were just being picked, and had the deep mahogany color, indicating maturity and high flavor.

We would suggest to our Cape friends that the soil and climate must be equally favorable to the production of grapes. At the time of the meeting of the board in Concord, we learned that one great secret of the success of vineyard culture in that locality was the sandy soil which gave bottom heat. Surely sand is not wanting on the Cape, and nowhere in the State is the season so prolonged for the maturity of the grape. Perhaps this suggestion is not worth a fig, but if ever in consequence of it, the barren plains become fruitful vineyards, and our Cape friends are permitted to sit under their own vines and fig-trees, we hope they will remember us and invite us down to another Barnstable fair.

Wednesday opened gloomily, with a drizzling rain, and we had a little touch of the east wind. A very respectable assembly, however, gathered around the dinner-table in the hall and listened to an eloquent address by Dr. Loring, on "The Progress of American Agriculture and its future Prospects." We had heard the same once or twice before, but the Doctor has the magic of making an old thing new.

In the evening the conclusion of the whole matter, we understood, was to culminate in a grand social time, enlivened with music, which would set the blood and feet in circulation; but other engagements compelled us to forego the pleasure of this occasion. With the usual tender of thanks, we submit this brief and imperfect report. ALEXANDER HYDE.

NANTUCKET.

According to appointment of the Board, I visited the island of Nantucket, at their thirteenth annual cattle show and fair, held September 30th, and October 1st. The morning of the 29th was a most lovely September morning, when, in company with my highly esteemed friend, the president of the Middlesex South Agricultural Society, we left the Old Colony depot, by the eight A. M. train, and arrived at Hyannis about twelve o'clock, M. Immediately taking the boat, we were soon making our way for the island of Nantucket, on a very rough sea, which made this part of the trip rather unpleasant to one unaccustomed to travelling by water. On our arrival we were met by our friend, James Thompson, who took us immediately to his most hospitable home.

We soon visited the hall of exhibition, where the ladies were gathered in considerable numbers, all seeming anxiously interested to hang appropriate mottoes, arrange the fruit, drawings, paintings, and all the beautiful handiwork usual on such occasions from the hands of the ladies, in the most attractive manner possible; and I think when the arrangements were completed, and the ladies consulted in regard to the beauties of the hall, they all felt abundantly rewarded for the time and labor expended.

We next visited the farm of James Thompson, where we were shown a herd of pure bred Jerseys, of rare beauty and promise. This farm is managed in a very economical manner; and I should judge, from the general farm arrangements, is one of the most successfully conducted farms on the island. We were kindly conducted by Mr. Thompson to other parts of the island, where we saw other herds, and the usual varieties of stock kept upon farms. There is some very good land on the island; still, I think there are thousands of acres that do not produce an income of one dollar per acre, or have growing upon them a single tree of any variety. I felt surprised, that a people of so much intelligence, enterprise, and wealth, did not put this land to some better use than lying in this wild, idle, barren and unsightly condition.

In the evening we again visited the hall and lower room, where the tables were loaded with the product of farm labor; every department seemed to be well represented. I found the farmers very intelligent and communicative. Mr. Charles Pauls stated that from one acre of land, manured only with two hundred loads of kelp, he raised ninety bushels of shelled corn. Other gentlemen had been equally successful with different farm crops, by the use of kelp and some barnyard manure. May we not expect where nature has so generously furnished the manure, that these waste lands ere long will be made a source of profit in the hands of those intelligent and enterprising agriculturists.

Several specimens of nice butter were on exhibition, Charles F. Swain taking the first prize. Some good cheese was shown;

Mrs. Charles Folger was awarded the first premium. The floral department was well represented, and the arrangement superb. Miss Mary S. Coffin received three dollars for the best collection of flowers. A very large and fine collection of fruit was on exhibition. Mr. Samuel King received the first prize for apples; Mr. James Thompson, for grapes; Mr. Samuel King, for peaches.

The department of manufactured articles was largely represented. Mr. James Thompson received the highest premium for his collection of hosiery and mittens. The fancy articles were numerous and truly beautiful.

This was the evening of the society's ball, when old and young meet and alike seem to enjoy the music and the dance.

In the morning of the second day of our visit, we were escorted to the society's spacious grounds, where we found a fine half-mile track for the exhibition of horses. The horse department was represented by a fine class of horses; no old pelters were noticed on the ground. John J. Backus took the first prize of twenty-five dollars for his stallion, Prince; R. E. Burgess, eight dollars for the best family horse. Four premiums were awarded on bulls. F. C. Sanford received the first premium of twelve dollars for his Jersey bull, Abe Lincoln. Charles G. Folger, twelve dollars, for his Ayrshire, Tam O'Shanter. James Thompson was awarded the first prize on his herd of Jerseys. The department of cows and heifers was much larger than usual; James Thompson taking the first premium for his Jersey cow, Lady May, and Charles G. Folger first prize for his Ayrshire cow, Rosa. We noticed one very superior Jersey cow on exhibition, owned by F. C. Sanford. The number of fat cattle on exhibition was very commendable.

One of the most pleasing features of a cattle show is the working oxen; in this instance they were out in large numbers, and called forth the admiration of all. The ploughing was done in a workmanlike manner, and was certainly deserving high commendation.

The sheep department was fairly represented; William S. Chadwick taking the first prize for his Southdown ram.

Seven premiums were offered on hogs, and no department was more fully represented. James Thompson exhibited one Chester sow, with her family of ten pigs; the sow weighing, at thirteeen months old, 250 pounds. The ten pigs weighed, at eleven weeks old, about one-half ton. It was considered the best family of hogs ever exhibited on the island.

The poultry coops were numerous and well filled with good specimens of each variety. The best collection offered by James Thompson.

Rarely has your delegate met a society where its members display more enterprise and enthusiasm, or where the State bounty is better applied.

I here tender my thanks to the officers and members of the society for kind attention. JOHN JOHNSON, Jr.

FRAMINGHAM, January 29, 1869.

MARTHA'S VINEYARD.

It was my privilege, as delegate of the State Board, to attend the tenth fair of the Martha's Vineyard Agricultural Society, which occurred October 20, 21 and 22. We did not reach the grounds until four o'clock of the first day of the fair, as it was held at West Tisbury, six miles from the landing at Holmes' Hole.

We proceeded at once to make a hurried examination of the cattle before they left the ground, which, although the number shown was not large, included some very fine animals.

Judging from the reports of former delegates to this society, we think no society in the State can boast of having made greater advancement in the improvement of stock than the Martha's Vineyard.

The people of the island, having decided that the Ayrshire was best suited to their climate and wants, the society, in 1863, purchased and brought to the island six thoroughbred Ayrshire bulls, and also some cows and heifers, and disposed of them to the farmers, binding them not to sell any of their stock off the island in five years; and the consequence is, that instead of there not being "a valuable animal on the ground," as the delegate in 1862 reported, there are now to be seen the thoroughbred and grade Ayrshire on every part of the island, embracing some as fine specimens of the Ayrshire stock, we think, as can be found in the State; and I am happy to say that some of it has recently found its way to Berkshire County.

With the sheep I was not as favorably impressed. For although the wool now grown is noted for its cleanness and beauty, I should judge the sheep were not heavy shearers. But I am informed that the finer breeds do not thrive in this climate.

As we did not wish to monopolize the time of the officers, who gave us every attention, we had some difficulty in finding the ploughing match, and did not reach the ground until operations had commenced.

We were sorry to see so little interest manifested in this department. We have always regarded it as a very important and interesting feature of our annual fairs, and we think it should not be arranged to occur during any other exercise, as on this occasion. The careful selection of the implement, the proper adjusting of depth to soil and crop, and the skill of the ploughman, has often more to do with the amount of yield than many of us are willing to admit. There were but two competitors, both of which did the work well, ploughing about seven inches deep.

If our venerable friend Captain Cottle directed his whale ship in the Arctic Ocean as skilfully as he did the plough on this occasion, we will venture to say that he must have been a safe and successful navigator.

Of the flowers, bread, cheese, butter, wine, jellies and preserves, pickles, painting, mechanical productions, domestic and fancy articles, fruit, vegetables and seeds, there was a good exhibition, especially of the last three named divisions.

I notice, by the report of the society, that Mr. Joseph Sylvia raised 110½ bushels of corn per acre; Joseph Davis, 109¼ bushels per acre; George D. Cottle, 108½ bushels per acre; Allen Look, 102⅐ bushels per acre; Obed Nickerson, 89 bushels per acre; W. Mayhew, 82⅐ bushels per acre.

The weather during the fair was unfavorable, and the number in attendance small; but we were glad to notice the absence of all intemperance, gambling and profanity. But all present, not only the farmers, but their wives and daughters, who did not send their articles, but came with them, seemed united to make this gathering what it should be—the *farmer's holiday;* for nowhere can be found a more hospitable and friendly people than can be seen at the homes and upon the fair grounds of Martha's Vineyard, which presented the appearance of an immense family gathering, rather than a jealous crowd of rivalling contestants.

Our thanks are due to Dr. Cleaveland and Mr. J. B. Nickerson for driving us over the Vineyard, and also to the New Bedford Band, Messrs. D. Mayhew, Henry L. Whiting and Dr. Pierce, for attentions received.

JOHN L. COLE.

RETURNS

OF

AGRICULTURAL SOCIETIES,

For 1868.

FINANCES.

SOCIETIES.	Amount receiv'd from the Commonwealth.	Income fr'm permanent fund.	New members & donations.	All other sources.	Receipts for the year.	Prem's offered.	Prem's and gratuities paid.	Current expen's for the year—not including premiums and gratuities.	Disbursem'ts for the year.	Indebtedness.	Value of real estate.	Value of personal property.	Permanent fund.
Massachusetts, .	-	$4,176 21	-	$1,255 00	$5,431 21	$1,450 00	$450 00	$5,646 51	-	-	-	-	-
Essex, . . .	$600 00	964 60	$222 00	2,375 60	4,162 20	2,046 00	974 00	2,248 57	$3,434 00	-	$6,000 00	$1,000 00	$11,941 01
Middlesex, . .	600 00	-	408 00	2,627 20	3,635 20	1,429 00	1,128 25	2,806 89	4,460 14	$900 00	8,000 00	1,000 00	9,000 00
Middlesex North, .	600 00	-	412 00	3,545 04	4,557 04	874 50	255 75	770 82	1,756 07	1,300 00	7,098 24	805 69	7,903 93
Middlesex South, .	600 00	-	74 00	658 73	1,332 73	1,338 00	454 35	745 63	1,199 98	2,500 00	9,300 00	1,100 00	10,400 00
Worcester, . .	600 00	-	825 00	5,001 54	6,426 54	2,285 25	2,029 56	2,004 13	6,485 57	25,500 00	60,000 00	100 00	15,000 00
Worcester West, .	600 00	200 00	63 00	1,749 81	2,612 81	1,839 00	1,355 00	1,143 00	3,089 57	5,586 00	14,350 00	612 00	8,764 00
Worcester North, .	600 00	24 40	195 00	10,317 35	11,136 75	2,154 75	1,458 50	9,044 10	10,502 60	7,000 00	16,000 00	850 00	9,850 00
Worcester N. West,	218 74	43 55	546 00	2,740 26	3,548 55	319 00	219 13	150 64	3,669 77	2,500 00	3,300 00	926 11	4,226 11
Worcester South, .	600 00	1,841 27	298 00	10,148 34	12,887 61	1,274 50	796 97	689 59	15,004 35	8,422 33	12,362 58	749 23	12,362 58
Worcester S. East, .	600 00	-	119 00	40 00	1,502 20	1,413 75	678 40	823 80	1,670 83	4,500 00	-	9,000 00	4,500 00
Hampshire, Hampden & Franklin, .	600 00	225 62	104 00	3,972 82	4,902 44	977 75	670 18	2,043 95	5,413 38	650 00	8,000 00	1,500 00	8,900 00
Hampshire, . .	600 00	617 00	183 70	400 00	1,800 70	943 50	643 70	482 53	1,526 23	400 00	5,900 00	550 00	5,900 00
Highland, . .	600 00	43 60	26 00	382 15	1,051 75	824 50	588 75	435 24	1,023 99	-	3,000 00	1,800 00	4,800 00
Hampden, . .	600 00	-	215 00	3,936 03	4,751 03	1,077 25	560 50	4,167 79	4,728 29	18,600 00	30,000 00	500 00	15,000 00
Hampden East, .	600 00	387 03	65 00	-	1,052 03	1,134 00	488 27	314 37	802 64	1,116 20	7,000 00	300 00	4,500 00
Union, . . .	301 93	-	94 50	126 84	523 27	339 25	120 85	301 32	421 87	-	1,100 00	843 25	1,943 25

Franklin, . .	$600 00	$110 00	$141 00	$795 12	$1,646 12	$1,232 50	$705 63	$1,331 51	$2,037 14	-	$7,000 00	$1,000 00	$8,000 00
Housatonic, . .	600 00	-	203 34	3,707 80	4,511 14	2,490 00	2,110 00	3,221 78	5,201 50	-	8,000 00	50 00	8,000 00
Berkshire, . .	600 00	712 50	210 00	4,177 05	4,387 05	2,464 00	2,283 50	1,563 21	3,846 71	-	12,000 00	3,500 00	15,000 00
Hoosac Valley, .	600 00	150 00	327 00	1,382 85	2,459 85	1,431 50	824 75	1,340 20	2,375 95	$4,200 00	8,000 00	275 00	3,525 00
Norfolk, . . .	600 00	-	105 00	2,730 15	3,435 15	1,728 75	568 75	2,539 35	3,108 10	-	10,414 00	350 00	10,414 00
Bristol, . . .	600 00	163 00	2,941 00	7,225 91	10,929 91	1,818 50	-	4,354 36	-	8,362 34	32,175 52	844 10	24,657 28
Bristol Central, .	600 00	-	48 00	4,306 66	4,954 66	2,486 75	1,838 00	3,003 89	4,841 89	3,573 23	18,627 87	1,000 00	16,054 64
Plymouth, . .	600 00	154 05	385 00	4,072 30	5,211 35	2,432 00	1,669 90	1,791 68	-	-	22,000 00	2,100 00	24,100 00
Marshfield, . .	420 26	-	295 00	2,176 55	2,891 81	611 00	250 34	963 50	2,554 01	68 22	2,923 90	561 95	3,755 43
Hingham, . .	600 00	-	2,216 00	9,855 16	12,671 16	1,579 51	1,087 10	11,945 81	12,812 10	7,000 00	28,130 50	3,431 05	21,130 50
Barnstable, . .	600 00	40 00	10 00	857 09	1,507 09	669 00	490 00	1,003 60	1,493 60	800 00	6,000 00	200 00	16,200 00
Nantucket, . .	600 00	175 46	26 25	440 23	1,040 23	1,001 50	586 50	786 90	1,292 84	-	3,551 00	600 00	4,151 00
Martha's Vineyard,	600 00	731 31	402 72	147 44	1,881 47	713 25	542 94	973 82	1,498 26	215 00	3,400 00	2,842 18	6,242 18
Totals, . . .	$16,540 93	$10,759 60	$11,160 51	$92,151 02	$128,830 15	$42,400 26	$26,026 57	$70,640 49	$106,262 38	$103,194 42	$359,633 61	$38,390 56	$296,220 91

PERMANENT FUND—HOW INVESTED.

Massachusetts.—In U. S. bonds, National banks, City of Boston bonds, Mass. Hospital Life Insurance Company.
Essex.—In bank stock, U. S. and R. R. bonds, farm, library, &c.
Middlesex.—In real estate, personal property, fixtures and mortgage.
Middlesex North.—In land, buildings and personal property.
Middlesex South.—In hall, land, pens and fixtures.
Worcester.—In real estate.
Worcester West.—In real estate and fixtures.
Worcester North.—In grounds, fixtures and cash.
Worcester North-West.—In real estate, Athol Savings Bank and notes.
Worcester South-East.—In buildings, fixtures, furniture, &c.
Worcester South.—In hall, land and track, pens, fixtures and insurance policy.
Hampshire, Franklin and Hampden.—In real estate and secured notes.
Hampshire.—In hall and grounds.
Highland.—In real estate, savings bank, U. S. bonds, mortgage.
Hampden.—In lands and buildings.
Hampden East.—In real estate, cattle-pens and fixtures.
Union.—In real estate, notes and cash.
Franklin.—In real estate and bank stock.
Housatonic.—In land and notes of members.
Berkshire.—In real estate.
Hoosac Valley.—In real estate.
Norfolk.—In real estate occupied by the Society.
Bristol.—In farm, buildings, pens, fixtures and cash.
Bristol Central.—In real estate and personal property.
Plymouth.—In real estate, furniture, fixtures, U. S. bond and cash.
Marshfield.—In real estate, personal property and cash.
Hingham.—In hall and grounds.
Barnstable.—In real estate.
Nantucket.—In real estate, personal property and U. S. bonds.
Martha's Vineyard.—In grounds, fixtures, personal property and secured notes.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.

FOR FARMS, FARM IMPROVEMENTS, MANURES, &c.

SOCIETIES.	For managem't of farms.	For draining.	For subsoiling.	For ploughing at the exhibition.	For reclaiming swamp lands.	For experime'ts with manures.	For spading.	For hedges and ornamental trees.	For reclaiming old pastures.	For orchards of all kinds.	For cranberries.	For other farm improvements.	Total amount offered for farm improvements.	Total am't awarded for farm improvements.	Total am't actually paid for farm improvements.
Massachusetts, ...	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex, ...	$20 00	-	-	$149 00	-	-	-	-	$15 00	-	-	-	$345 00	$184 00	$184 00
Middlesex, ...	-	-	-	74 00	-	-	-	-	-	-	-	-	187 00	74 00	74 00
Middlesex North, . . .	-	-	-	35 00	-	-	-	-	-	-	$4 50	-	120 00	39 50	-
Middlesex South, . . .	-	-	-	51 00	$10 00	-	-	-	-	$5 00	-	-	228 00	67 00	56 00
Worcester, ...	-	-	-	103 00	-	-	-	-	-	-	-	-	123 00	103 00	103 00
Worcester West, . . .	-	-	-	54 00	-	-	-	-	-	-	-	-	134 00	54 00	54 00
Worcester North, . . .	-	-	-	80 00	-	-	-	$15 00	-	-	-	-	210 00	95 00	87 00
Worcester North-West, .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worcester South, . . .	-	-	-	54 00	-	-	-	-	-	-	-	$1 75	-	156 25	55 75
Worcester South-East, . .	10 00	-	-	104 00	12 00	-	-	-	10 00	9 00	-	-	238 00	145 00	145 00
Hamps. Franklin & Hampd.,	-	-	-	-	-	-	-	-	-	-	2 00	-	20 00	2 00	1 00
Hampshire, ...	-	-	-	-	-	-	-	-	-	3 00	-	-	123 00	3 00	3 00
Highland, ...	4 00	-	-	-	-	-	-	-	-	-	9 00	-	33 00	13 00	13 00
Hampden, ...	-	-	-	-	-	-	-	-	-	-	-	-	155 50	-	-

Hampden East, . . .	-	-	-	$22 00	-	-	-	-	-	-	$0 75	-	$212 00	$22 75	$22 75
Union, ...	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Franklin, ...	-	-	-	-	$5 00	-	-	-	-	$5 00	-	-	53 00	10 00	5 00
Housatonic, ...	-	-	-	51 00	23 00	-	-	-	-	26 00	3 00	-	122 00	103 00	103 00
Berkshire, ...	$50 00	-	-	31 00	-	-	-	-	-	36 00	-	-	134 00	117 00	117 00
Hoosac Valley, . . .	-	$6 00	-	-	-	-	-	-	$5 00	15 00	-	-	56 00	26 00	26 00
Norfolk, ...	-	-	-	62 00	-	-	-	-	-	-	-	-	364 00	62 00	70 00
Bristol, ...	-	-	-	102 00	-	-	-	-	-	-	-	-	350 00	102 00	102 00
Bristol Central, . . .	-	-	-	44 00	-	-	-	-	-	-	3 00	-	252 00	47 00	47 00
Plymouth, ...	-	-	-	42 00	-	-	-	-	-	-	-	-	104 00	42 00	42 00
Marshfield, ...	-	-	-	16 00	-	-	-	-	-	-	5 00	-	41 00	21 00	18 87
Hingham, ...	-	-	-	40 00	-	-	-	-	-	-	-	-	142 16	-	-
Barnstable, ...	-	-	-	19 00	-	-	-	-	-	12 00	3 00	-	64 00	34 00	34 00
Nantucket, ...	-	-	-	9 00	-	-	-	-	-	5 00	-	-	81 00	14 00	14 00
Martha's Vineyard, . .	-	-	-	8 00	-	$4 00	-	-	-	9 00	3 75	-	56 00	24 75	24 75
Totals, ...	$84 00	$6 00	-	$1,150 00	$50 00	$4 00	-	$15 00	$30 00	$125 00	$34 00	$1 75	$3,947 66	$1,581 25	$1,292 12

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Continued.

FOR FARM STOCK.

SOCIETIES.	For Bulls.	For Milch Cows.	For Heifers.	For Calves.	For Working Oxen.	For Steers.	For Fat Cattle.	For Horses.	For Sheep.	For Swine.	For Poultry.	All other Stock.	Total amount offered for Live Stock.	Total amount awarded for Live Stock.	Total amount paid out for Live Stock.
Massachusetts, . .	-	-	-	-	-	-	-	$450 00	-	-	-	-	$450 00	$450 00	$450 00
Essex, ...	$35 00	$25 00	$47 00	$6 00	$52 00	$13 00	$23 00	137 00	$22 00	$26 00	$20 00	-	567 00	401 00	375 00
Middlesex, . . .	46 00	113 00	27 00	6 00	28 00	5 00	8 00	184 00	10 00	45 00	45 00	$30 00*	691 00	547 00	547 00
Middlesex North, . .	19 00	28 50	32 00	-	34 00	4 00	-	68 00	11 00	18 00	19 00	-	377 50	223 50	135 50
Middlesex South, . .	21 00	75 00	26 00	18 00	18 00	-	5 00	132 00	19 00	40 00	23 25	45 00*	599 00	422 25	191 75
Worcester, . . .	87 00	160 00	90 00	20 00	90 00	65 00	21 00	1,117 00	33 00	42 00	21 00	-	2,024 00	1,746 00	1,746 00
Worcester West, . .	44 00	95 00	15 00	24 00	56 00	39 00	53 00	649 00	11 00	27 00	14 00	69 00	1,327 00	1,096 00	1,066 50
Worcester North, . .	36 00	57 00	47 00	89 00	35 00	35 00	35 00	739 00	37 00	24 00	14 50	35 00	1,432 00	1,183 50	1,103 50
Worcester North-West,	15 00	13 00	5 00	4 00	10 00	12 00	8 00	60 00	5 00	6 00	6 00	38 00	199 00	182 00	147 00
Worcester South, . .	52 00	44 00	65 00	19 00	54 00	59 00	20 00	162 00	19 00	31 00	5 50	44 00	838 50	574 50	574 50
Worcester South-East,	30 00	37 00	32 00	-	50 00	33 00	16 00	121 00	19 00	37 00	6 00	50 00	491 00	431 00	376 00
Hampshire, Franklin & Hampden, . . .	33 00	24 00	12 00	18 00	82 00	9 00	96 00	213 00	42 00	17 00	4 75	78 00	693 50	628 75	477 18
Hampshire, . . .	23 00	17 00	10 00	19 00	38 00	31 00	28 00	153 00	29 00	21 00	10 00	90 00	462 00	389 50	346 00
Highland, . . .	27 00	16 00	15 50	4 25	34 00	23 50	17 00	107 00	56 00	10 50	75	57 00	533 25	368 50	368 50

Hampden,	$36 00	$38 00	$42 00	$14 00	$53 00	$21 00	$47 00	$325 00	$5 00	$2 00	$2 50	-	$798 00	$585 50	$489 50
Hampden East,	38 00	27 00	18 00	7 00	41 00	36 00	15 00	28 00	14 00	15 00	6 75	$32 00	471 00	277 75	277 75
Union,	50 00	6 00	5 00	1 50	18 00	10 50	-	44 00	-	1 50	1 00	-	222 50	105 00	92 00
Franklin,	26 00	72 00	21 00	12 00	31 00	50 00	20 00	38 00	102 00	27 00	11 00	107 00	832 00	517 00	497 00
Housatonic,	55 00	83 00	37 00	17 00	84 00	48 00	30 00	205 00	104 00	32 00	41 50	37 00	812 00	773 50	773 50
Berkshire,	70 00	67 00	45 00	20 00	43 00	38 00	32 00	613 00	133 00	36 00	40 00	73 00	1,395 00	1,219 00	1,219 00
Hoosac Valley,	19 00	10 00	15 00	6 00	19 00	12 00	5 00	131 00	80 00	12 00	30 00	-	560 00	339 00	339 00
Norfolk,	34 00	83 00	27 00	-	10 00	-	14 00	163 00	15 00	20 00	39 50	-	608 00	405 50	200 50
Bristol,	-	36 00	21 00	-	192 75	60 00	40 00	153 00	22 00	44 00	35 50	10 00	545 00	-	-
Bristol Central,	60 00	46 00	34 00	8 00	68 00	20 00	28 00	144 00	28 00	35 00	27 50	-	568 00	498 50	498 50
Plymouth,	44 12	84 00	39 00	22 28	37 00	32 00	63 20	519 00	25 00	43 00	40 00	71 20	1,394 00	1,019 80	1,019 80
Marshfield,	12 00	13 00	5 00	4 00	16 00	7 00	6 00	47 00	7 00	12 00	13 75	-	207 00	142 75	112 75
Hingham,	28 00	42 00	23 00	27 00	20 00	6 00	65 00	54 00	74 50	73 50	22 95	39 00	694 00	474 95	474 95
Barnstable,	15 00	-	18 00	5 00	15 00	10 00	42 00	73 00	19 00	43 00	15 00	-	288 00	255 00	255 00
Nantucket,	42 00	107 50	-	-	27 00	-	7 00	129 00	22 00	21 00	19 00	-	464 00	374 50	374 50
Martha's Vineyard,	22 00	27 00	36 75	7 00	25 00	6 00	30 00	34 50	38 00	11 00	6 25	10 00	301 25	253 50	253 50
Totals,	$1,019 12	$1,446 00	$810 25	$378 03	$1,280 75	$684 20	$774 20	$6,992 50	$992 50	$772 50	$545 95	$917 00	$20,714 50	$15,905 25	$14,781 68

* Herds of Cattle.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Continued.

FOR FARM PRODUCTS.

SOCIETIES.	Indian Corn.	Wheat.	Rye.	Barley.	Oats.	Beans.	Grass Crops.	Grass Seeds.	Potatoes.	Carrots.	Beets.	Parsnips.	English Turnips.	Ruta-Bagas.	Onions.	Other Root Crops.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$82 50*
Middlesex,	$8 00	-	-	-	-	$1 00	-	-	-	-	-	-	-	-	-	81 00*
Middlesex North,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Middlesex South,	8 00	-	-	-	-	4 00	-	-	-	-	-	-	-	-	-	38 50
Worcester,	5 00	$1 00	$2 00	-	$3 00	-	-	-	$6 00	$2 00	$3 00	$2 00	$2 00	$2 00	$2 00	5 00
Worcester West,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worcester North,	37 00	28 00	6 00	-	-	6 50	-	-	12 25	-	75	-	75	-	1 25	-
Worcester North-West,	1 00	-	-	-	1 00	-	-	-	-	-	-	-	-	-	-	3 00
Worcester South,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worcester South-East,	16 00	-	-	-	-	-	-	-	2 00	4 00	4 00	-	-	6 00	2 00	37 00
Hamps., Franklin & Hampden,	-	-	-	-	-	-	-	-	1 00	-	-	-	-	-	-	4 50
Hampshire,	1 50	6 00	3 00	$3 00	3 00	-	-	-	3 00	1 00	1 00	1 00	1 00	1 00	3 00	-
Highland,	16 00	4 00	3 00	3 00	5 00	2 00	$5 00	$5 00	9 00	5 00	-	-	-	5 00	-	-
Hampden,	-	-	-	-	-	-	-	-	8 00	-	50	-	-	-	50	-

Hampden East,	$1 75	-	$1 25	-	-	$2 00	-	-	$2 00	$0 50	$1 25	$0 75	$0 75	-	$1 00	-
Union,	75	-	-	-	-	-	-	-	50	-	-	-	-	-	-	$2 75
Franklin,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15 50*
Housatonic,	112 50	$43 00	60 00	$18 00	$55 00	9 00	$15 00	$9 00	$39 00	14 00	13 00	10 00†	21 00‡	$9 00	1 50	29 00
Berkshire,	56 00	21 00	55 00	14 00	57 00	6 00	12 00	13 00	36 00	6 00	6 00	-	6 00	6 00	-	-
Hoosac Valley,	15 00	15 00	14 00	15 00	15 00	5 00	-	7 50	15 00	-	3 00	-	6 00	-	3 00	5 00
Norfolk,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41 50
Bristol,	36 00	-	-	-	-	-	13 00	-	10 00	-	-	-	-	-	16 00	78 75*
Bristol Central,	37 00	1 00	-	-	-	4 00	8 00	-	14 00	-	-	-	10 00	-	8 00	17 00
Plymouth,	55 00	-	-	-	7 00	-	-	-	7 00	-	-	-	7 00	-	-	-
Marshfield,	4 25	-	-	-	-	50	-	-	5 50	-	-	-	50	-	75	-
Hingham,	39 00	-	8 00	-	-	-	-	-	10 00	-	6 00	-	6 00	-	-	-
Barnstable,	6 00	5 00	-	-	-	-	-	-	-	-	4 00	3 00	-	-	-	-
Nantucket,	14 00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Martha's Vineyard,	30 99	-	2 30	-	8 40	3 95	11 00	-	5 65	6 00	1 10	-	90	-	4 00	-
Totals,	$500 74	$124 00	$154 55	$53 00	$154 40	$43 95	$64 00	$34 50	$185 90	$38 50	$43 60	$16 75	$61 90	$29 00	$43 00	$441 00

* Collections of Vegetables.

† Cabbages.

‡ Hops and Tobacco.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Continued.

FARM PRODUCTS—Concluded.

SOCIETIES.	Total amount offered for Grain and Root Crops.	Total am't awarded for Grain and Root Crops.	Total am't paid for Grain and Root Crops.	Broomcorn Brush.	Fruits.	Flowers.	Any other cultivated Crops.	Milk.	Butter.	Cheese.	Honey.	Wheat Bread.	Rye and Indian Bread.	Corn Bread.	Total am't paid out under the head of Farm Products.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	-	-	-	-	$165 00	$26 00	-	-	$35 00	$13 00	-	-	$20 00*	-	$330 00
Middlesex,	$99 00	$90 00	$90 00	-	151 00	25 00	-	-	20 00	-	$18 00*	$9 00	3 00	-	406 00
Middlesex North,	97 00	8 00	5 00	-	60 25	-	-	-	-	16 00	-	3 00	12 00	$6 00	77 25
Middlesex South,	148 00	42 50	39 25	-	65 00	17 25	-	-	14 00	-	14 50*	8 00	3 00	-	70 00
Worcester,	45 00	35 00	35 00	-	-	-	-	-	27 00	43 00	2 00	2 00	2 00	-	111 00
Worcester West,	54 00	-	-	-	53 00	15 75	$9 25	-	10 00	54 00	-	6 00	6 00	-	143 50
Worcester North,	168 00	92 50	17 00	-	71 50	11 00	37 50	-	12 50	4 50	-	4 75	3 50	-	150 00
Worcester North-West,	10 00	5 00	5 00	-	8 00	9 00	-	-	3 00	5 00	-	1 50	1 00	-	30 50
Worcester South,	50 00	-	-	-	44 77	5 25	18 50	-	9 00	14 00	50	11 00	6 00	-	109 02
Worcester South-East,	101 00	71 00	62 00	-	95 50	11 43	-	-	15 00	-	3 00	-	5 50*	-	191 93
Hamps., Franklin & Hampden,	83 00	10 50	10 50	-	32 50	8 00	-	-	10 00	3 00	-	4 00	2 50	-	65 00
Hampshire,	27 00	27 00	26 00	-	35 00	38 00	21 00	-	10 00	10 00	-	3 00	3 00	3 00	90 00
Highland,	84 00	62 00	62 00	-	10 50	3 25	11 75	-	6 00	5 00	5 00*	75	75	75	105 75

Hampden,	$46 95	$9 00	$6 00	-	$30 50	$14 50	$10 00	-	$3 00	$5 00	$1 00	-	-	-	$45 75
Hampden East,	156 00	11 35	11 35	-	36 50	8 25	25 25	-	21 00	15 00	3 50	$3 75	$7 75	$2 25	279 20
Union,	47 50	4 00	4 00	-	2 75	1 75	-	-	3 00	1 75	50	50	50	-	11 25
Franklin,	51 50	15 50	14 00	-	54 50	15 50	-	-	10 00	7 50	1 00	-	-	12 00*	102 00
Housatonic,	466 00	458 00	458 00	$4 00	120 00	34 00	-	-	36 00	35 00	17 00	9 00	12 00	-	1,183 00
Berkshire,	295 00	294 00	294 00	-	88 00	10 00	45 00*	-	36 00	38 00	10 00	13 50	6 50	6 50	557 00
Hoosac Valley,	330 00	118 50	118 50	-	57 00	18 00	-	-	12 00	16 00	8 00	5 00	5 00	3 00	242 00
Norfolk,	86 00	41 50	34 00	-	180 00	25 00	-	-	26 00	-	-	9 00	3 00	-	246 00
Bristol,	347 00	153 75	153 75	-	82 00	24 00	-	-	25 00	20 00	30 00	4 50	3 75	11 00*	354 00
Bristol Central,	210 00	99 00	99 00	-	63 00	9 00	-	-	23 00	11 00	15 00	9 00	3 75	1 00	233 75
Plymouth,	175 00	76 00	76 00	-	85 50	37 00	-	-	39 00	39 00	2 00	9 25	8 75	-	296 50
Marshfield,	88 00	13 25	11 50	-	42 75	10 00	8 25	-	10 00	5 00	2 25	6 00	3 00	7 75	72 86
Hingham,	138 00	69 00	69 00	-	103 15	18 50	59 20	-	16 50	6 00	7 00	6 00	4 50	-	299 65
Barnstable,	91 00	18 00	18 00	-	29 50	16 50	-	-	6 00	5 00	-	6 00	6 00	-	105 00
Nantucket,	209 00	52 50	52 50	-	39 75	10 75	-	-	10 00	3 00	2 00	1 00	-	-	139 00
Martha's Vineyard,	126 00	74 29	74 29	-	40 25	5 65	-	-	12 25	5 00	1 00	3 50	4 50	2 50	148 94
Totals,	$3,868 95	$1,971 14	$1,841 64	$4 00	$1,846 17	$440 33	$254 70	-	$461 25	$379 75	$143 25	$139 10	$71 25	$54 75	$6,190 85

* Sundries.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Concluded.

MISCELLANEOUS.

SOCIETIES.	Amount awarded for Agricultural Implements.	Amount offered for raising forest trees.	Amount awarded and paid out for the same.	Amount for experiments on manures.	Am't awarded for all other objects strictly agricultural not specified above.	Amount awarded for objects other than agricultural.	No. of persons who received premiums and gratuities.
Massachusetts, . .	–	$1,000 00	–	–	–	–	6
Essex, ...	$35 00	30 00	–	$40 00	–	–	155
Middlesex, . . .	68 00	–	–	–	–	$123 25	192
Middlesex North, .	–	–	–	–	–	–	86
Middlesex South, .	26 00	60 00	–	25 00	–	73 00	–
Worcester, . . .	51 00	22 00	–	–	–	21 00	246
Worcester West, . .	20 00	30 00	–	10 00	$28 00	72 50	185
Worcester North, .	43 00	50 00	$15 00	–	–	115 60	222
Worcester North-West,	–	–	–	–	–	49 00	108
Worcester South, .	1 50	35 00	–	–	56 20	–	142
Worcester South-East,	12 00	30 00	–	–	–	21 00	274
Hampshire, Franklin and Hampden,	–	20 00	–	–	–	97 00	162
Hampshire, . . .	45 50	12 00	–	–	–	108 00	289
Highland, . . .	4 00	–	–	–	–	97 50	136
Hampden, . . .	24 00	15 00	–	–	–	28 75	63
Hampden East, . .	–	25 00	–	86 00	–	90 50	72
Union, ...	–	–	–	–	–	40 00	70
Franklin, . . .	50	10 00	–	9 00	18 50	81 25	164
Housatonic, . . .	48 00	–	–	–	–	315 50	392
Berkshire, ...	62 50	–	–	–	–	337 00	463
Hoosac Valley, . .	–	–	–	–	55 50	126 00	164
Norfolk, . . .	18 00	15 00	–	–	–	37 50	157
Bristol, ...	16 00	–	–	60 00	–	298 50	–
Bristol Central, . .	–	–	–	–	–	152 25	209
Plymouth, . . .	10 00	60 00	–	–	163 00	238 60	390
Marshfield, . . .	3 00	30 00	–	–	–	69 00	236
Hingham, . . .	–	–	–	–	53 00	229 50	600
Barnstable, . . .	–	7 00	7 00	12 00	–	90 00	210
Nantucket, . . .	–	13 00	–	–	–	55 25	234
Martha's Vineyard, .	–	25 00	6 00	14 00	21 90	87 85	184
Totals, . . .	$490 00	$1,089 00	$28 00	$256 00	$393 10	$3,055 30	5,811

NAMES of Cities and Towns to which the Premiums and Gratuities were disbursed, and the amount to each.

MASSACHUSETTS.

At large, three scholarships in Mass. Agricultural College,	$162 00	Lynn,	$150 00
		Newburyport,	200 00
		Tyngsborough,	100 00

ESSEX.

Amesbury,	$36 00	Lynnfield,	$2 00
Andover,	15 00	Lynn,	1 00
Beverly,	1 00	Marblehead,	13 00
Boston,	12 00	Methuen,	18 00
Boxford,	7 00	Newbury,	160 00
Bradford,	7 00	Newburyport,	310 00
Danvers,	149 00	North Andover,	52 00
Essex,	1 00	Peabody,	7 00
Fitchburg,	5 00	Rowley,	15 00
Georgetown,	7 00	Salem,	18 00
Groveland,	13 00	Salisbury,	2 00
Hamilton,	35 00	Topsfield,	13 00
Haverhill,	33 00	Wenham,	14 00
Ipswich,	17 00	West Newbury,	148 00
Lawrence,	2 00	Total,	$1,113 00

MIDDLESEX.

Acton,	$58 50	Chelmsford,	$12 00
Arlington,	4 00	Concord,	316 75
Bedford,	10 00	Fitchburg,	7 00
Belmont,	126 00	Framingham,	38 50
Billerica,	3 00	Groton,	12 00
Boston,	25 00	Harvard,	10 00
Boxborough,	1 50	Hudson,	5 00
Burlington,	19 00	Lexington,	103 50
Cambridge,	27 00	Lincoln,	76 00
Carlisle,	28 50	Littleton,	61 00

MIDDLESEX—CONCLUDED.

Lowell, ...	$8 00	Waltham, ...	$32 00
Newton, ...	2 00	Wayland, ...	39 00
Pepperell, ...	7 00	Weston, ...	6 50
Reading, ...	4 00	Winchendon, . . .	5 00
Somerville, ...	16 00	Winchester, . . .	27 00
Stow, ...	11 00	Woburn, ...	13 00
Sudbury, ...	13 50	Total, . . .	$1,128 25

MIDDLESEX NORTH.

Billerica, ...	$6 50	Lowell, ...	$65 50
Carlisle, ...	4 00	Tewksbury, . . .	55 75
Chelmsford, . . .	54 00	Tyngsborough, . . .	31 00
Dracut, ...	12 00	Wakefield, ...	2 00
Dunstable, ...	25 00	Total, ...	$255 75

MIDDLESEX SOUTH.

Ashland, ...	$3 00	Out of the district, . .	$35 35
Framingham, . . .	481 80	Sherborn, ...	7 75
Hopkinton, ...	20 25	Southborough, . . .	45 00
Holliston, ...	14 50	Sudbury, ...	34 00
Marlborough, . . .	6 55	Wayland, ...	60 25
Natick, ...	48 60	Total, ...	$757 05

WORCESTER.

Auburn, ...	$16 50	Millbury, ...	$117 00
Barre, ...	46 00	New Braintree, . . .	32 00
Berlin, ...	8 00	Northborough, . . .	2 00
Bolton, ...	5 00	Northbridge, . . .	15 00
Charlton, ...	46 00	Oxford, ...	18 00
Dudley, ...	8 00	Out of district, . . .	127 00
Fitchburg, ...	405 00	Princeton, ...	111 00
Grafton, ...	17 00	Shrewsbury, . . .	26 00
Holden, ...	1 00	Spencer, ...	2 50
Leominster, . . .	1 00	Sutton, ...	152 00

WORCESTER—Concluded.

Upton,	$25 00	Worcester,	$732 25
Westborough,	75 00		
West Boylston,	38 75	Total,	$2,027 00

WORCESTER WEST.

Athol,	$8 75	Oakham,	$18 50
Barre,	511 25	Palmer,	50 00
Boston,	225 00	Petersham,	24 25
Brookfield,	70 00	Phillipston,	9 50
Charlton,	6 00	Prescott,	4 00
Dana,	75	Princeton,	79 00
Fitchburg,	20 00	Sutton,	30 00
Hardwick,	45 25	Unknown,	1 00
Hubbardston,	6 50	Warren,	12 00
New Braintree,	49 25	Worcester,	132 00
North Brookfield,	52 00	Total,	$1,355 00

WORCESTER NORTH.

Antrim, N. H.,	2 00	Princeton,	$224 50
Ashburnham,	5 00	Shirley,	10 00
Ashby,	15 50	Sterling,	48 25
Brighton,	130 00	Townsend,	10 00
Fitchburg,	707 35	West Boylston,	9 50
Harvard,	71 00	Westminster,	16 00
Hubbardston,	1 00	Wilton, N. H.,	20 00
Leominster,	107 90	Winchendon,	20 00
Littleton,	10 00		
Lunenburg,	$50 50	Total,	$1,458 50

WORCESTER NORTH-WEST.

Athol,	$114 48	Phillipston,	$52 00
Barre,	5 00	Royalston,	14 67
Brattleborough, Vt.,	2 66	Templeton,	2 00
New Salem,	5 00	Warwick,	67
Orange,	9 32		
Petersham,	13 33	Total,	$219 13

WORCESTER SOUTH.

Belchertown, . . .	$1 00	Southbridge, . . .	$144 50
Brimfield, ...	21 50	Spencer, ...	9 00
Brookfield, ...	26 00	Sturbridge, ...	241 57
Charlton, ...	184 00	Sutton, ...	10 00
Dudley, ...	48 50	Warren, ...	57 00
Holland, ...	18 50	Webster, ...	18 40
North Brookfield, . .	1 00	Woodstock, ...	1 00
Oxford, ...	15 00	Total, ...	$796 97

WORCESTER SOUTH-EAST.

Bellingham, . . .	$18 50	Mendon, ...	$81 00
Blackstone, ...	13 00	Milford, ...	288 09
Framingham, . . .	11 00	Sutton, ...	85 00
Franklin, ...	6 00	Upton, ...	56 00
Grafton, ...	10 00	Uxbridge, ...	47 25
Hopkinton, ...	100 25	Westborough, . . .	73 50
Holliston, ...	32 25	Worcester, ...	10 00
Medway, ...	12 50	Total, ...	$834 34

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Amherst, ...	$14 00	Northampton, . . .	$252 50
Belchertown, . . .	2 00	Prescott, ...	6 00
Chesterfield, . . .	1 00	South Hadley, . . .	53 00
Chicopee, ...	45 00	Southampton, . . .	12 00
Conway, ...	5 50	Springfield, ...	22 00
Deerfield, ...	132 00	Sunderland, . . .	11 00
Easthampton, . . .	31 25	Westfield, ...	6 00
Granby, ...	2 00	Westhampton, . . .	10 00
Hadley, ...	85 00	Whately, ...	7 00
Hatfield, ...	56 00	Williamstown, . . .	33 50
Huntington, . . .	9 50		
Leverett, ...	6 00	Total, ...	$802 25

HAMPSHIRE.

Amherst, ...	$227 65	Barre, ...	$4 00
Auburn, N. Y., . . .	3 00	Belchertown, . . .	39 25

HAMPSHIRE—Concluded.

Cambridge, Vt.,	$2 00	Northampton,	$5 00
Conway,	1 00	Prescott,	10 00
Easthampton,	4 00	South Hadley,	15 00
Enfield,	11 00	Springfield,	1 00
Granby,	25 00	Sunderland,	83 05
Hadley,	75 75	Ware,	9 50
Leverett,	79 00	Worcester,	1 00
Montague,	2 00	Total,	$598 70

HIGHLAND.

Amherst,	$2 00	Northampton,	$3 75
Becket,	58 00	Peru,	45 50
Chester,	41 75	Russell,	2 00
Dalton,	9 50	Sandisfield,	4 00
Easthampton,	75	Southampton,	16 00
Hinsdale,	105 50	Springfield,	1 00
Huntington,	14 00	Stockbridge,	7 00
Lanesborough,	22 00	Washington,	4 00
Lee,	21 50	Worthington,	11 75
Middlefield,	215 75		
Montgomery,	3 00	Total,	$588 75

HAMPDEN.

Agawam,	$11 50	Southwick,	$5 00
Blandford,	3 00	Springfield,	272 50
Chicopee,	124 50	Westfield,	26 00
Holyoke,	25 00	West Springfield,	24 25
Longmeadow,	53 75	Wilbraham,	1 00
Ludlow,	13 00		
South Hadley,	1 00	Total,	$560 50

HAMPDEN EAST.

Brimfield,	$15 25	Wales,	$8 00
Holland,	2 50	Ware,	2 50
Ludlow,	12 00	Wilbraham,	8 50
Monson,	288 67		
Palmer,	150 85	Total,	$488 27

UNION.

Becket,	$0 50	Montgomery,	$1 00
Blandford,	99 35	Russell,	10 50
Chester,	3 25	Sandisfield,	3 50
Huntington,	1 25	Tolland,	50
Lee,	2 00	Total,	$121 85

FRANKLIN.

Bernardston,	$57 75	Leyden,	$14 50
Coleraine,	18 25	Montague,	9 75
Conway,	68 25	Northfield,	6 50
Deerfield,	115 88	Shelburne,	225 50
Erving,	12 50	Sunderland,	36 25
Gill,	12 00	Wendell,	75
Greenfield,	117 25	Out of the district,	1 00
Leverett,	9 50	Total,	$705 63

HOUSATONIC.

Adams,	$12 00	New Marlborough,	$54 50
Alford,	70 00	Pittsfield,	12 00
Becket,	11 00	Richmond,	8 00
Egremont,	176 00	Sandisfield,	14 50
Great Barrington,	546 50	Sheffield,	422 00
Lanesborough,	4 00	Stockbridge,	178 00
Lee,	135 00	Tyringham,	17 00
Lenox,	143 50	West Stockbridge,	49 00
Monterey,	56 00	Miscellaneous,	283 00
Mount Washington,	9 00	Total,	$2,201 00

BERKSHIRE.

Agawam,	$3 00	Egremont,	$6 00
Alford,	6 00	Great Barrington,	33 00
Becket,	5 50	Hancock,	24 00
Cheshire,	37 00	Hinsdale,	37 00
Dalton,	51 50	Lanesborough,	178 50

BERKSHIRE—Concluded.

Lee,	$127 00	South Williamstown,	$24 00
Lenox,	364 50	Springfield,	5 00
Monterey,	4 00	Stockbridge,	128 50
New Ashford,	22 00	Washington,	4 50
North Adams,	299 50	Westfield,	3 00
Peru,	8 00	West Stockbridge,	9 00
Pittsfield,	630 50	Williamstown,	84 00
Richmond,	51 00	Windsor,	7 50
Savoy,	3 00		
South Adams,	127 00	Total,	$2,275 50

HOOSAC VALLEY.

Clarksburg,	$24 00	Pownall, Vt.,	$16 00
Cheshire,	41 00	Savoy,	7 00
Florida,	1 50	South Adams,	112 50
Lanesborough,	9 00	Stamford, Ct.,	11 00
Lenox,	23 00	Williamstown,	273 00
North Adams,	303 75		
Pittsfield,	3 00	Total,	$824 75

NORFOLK.

Boston,	$7 00	Needham,	$119 00
Brookline,	15 00	Randolph,	3 00
Dedham,	116 25	Roxbury,	42 00
Dorchester,	60 00	Sharon,	15 00
Dover,	35 00	Stoughton,	6 00
Foxborough,	8 00	Walpole,	7 00
Franklin,	10 00	West Roxbury,	79 00
Medfield,	5 50		
Milton,	41 00	Total,	$568 75

BRISTOL.

No Returns relative to distribution.

BRISTOL CENTRAL.

Acushnet,	$49 00	Middlesex,	$5 00
Berkley,	48 00	Myricksville,	14 50
Boston,	1 00	New Bedford,	85 00
Dartmouth,	15 75	Norton,	16 00
Dighton,	1 00	Raynham,	61 25
Fairhaven,	38 00	Rochester,	12 50
Fall River,	222 00	Somerset,	59 50
Freetown,	24 50	Taunton,	166 75
Lakeville,	96 50	Westport,	29 00
Mansfield,	14 00	Total,	$959 25

PLYMOUTH.

Abington,	$59 62	Middleborough,	$105 75
Bridgewater,	509 50	New Bedford,	16 50
Carver,	3 00	North Bridgewater,	297 87
Duxbury,	4 00	Pembroke,	1 50
East Bridgewater,	132 50	Plymouth,	166 62
Halifax,	48 71	Plympton,	78 30
Hanson,	1 20	Rochester,	16 24
Kingston,	57 24	Taunton,	2 00
Lakeville,	33 35	West Bridgewater,	127 75
Mansfield,	5 00		
Marshfield,	3 25	Total,	$1,669 90

MARSHFIELD.

Abington,	$3 00	North Bridgewater,	$1 50
Boston,	3 00	Pembroke,	19 50
Duxbury,	62 50	Plymouth,	3 00
Hanover,	1 50	Scituate,	10 50
Kingston,	10 75		
Marshfield,	135 13	Total,	$250 38

HINGHAM.

Cohasset,	$18 50	Hingham,	$931 25
Hanover,	9 25	Hull,	17 00

HINGHAM—CONCLUDED.

Marshfield,	$1 50	Weymouth,	$22 80
Quincy,	32 05		
South Scituate,	51 75	Total,	$1,087 10

BARNSTABLE.

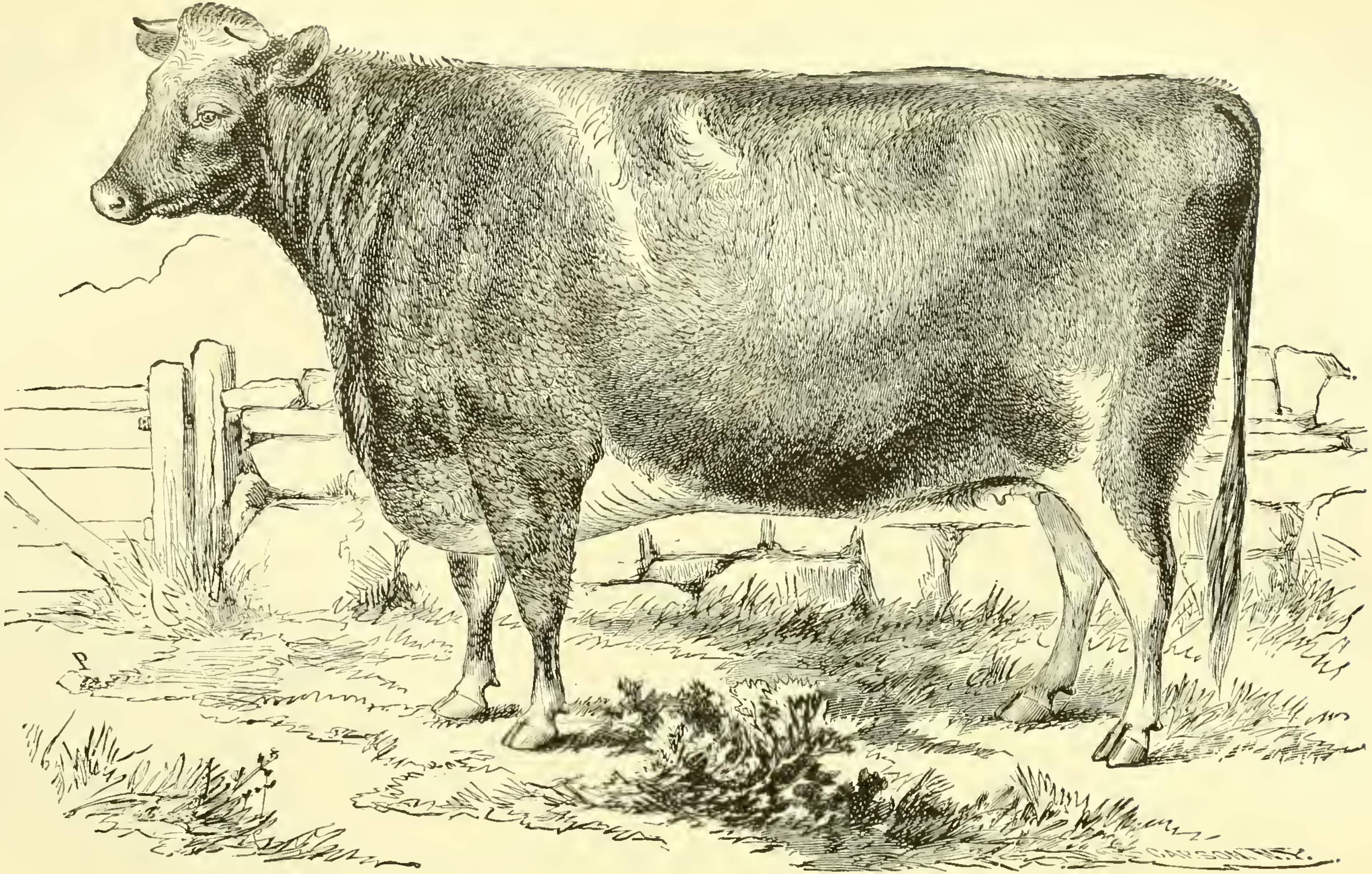
Barnstable,	$325 00	Orleans,	$5 00
Brewster,	5 00	Sandwich,	60 00
Dennis,	20 00	Unknown,	39 50
Eastham,	9 00	Yarmouth,	21 00
Falmouth,	3 00		
Harwich,	2 50	Total,	$490 00

NANTUCKET.

Nantucket,	$586 50

MARTHA'S VINEYARD.

Chilmark,	$157 12	Tisbury,	$329 77
Edgartown,	56 05	Total,	$542 94



"MATTIE NEWELL."—Bred and Owned by J. A. Harwood, Littleton.
See Preface to Abstract.

ABSTRACT OF RETURNS

OF THE

AGRICULTURAL SOCIETIES

OF

MASSACHUSETTS,

1868.

EDITED BY
CHARLES L. FLINT,
SECRETARY OF THE STATE BOARD OF AGRICULTURE.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
79 MILK STREET, (CORNER OF FEDERAL).
1869.

PREFACE.

I am indebted to the owners of the animals illustrated in this volume for the use of the engravings, and my thanks are due to them on behalf of the Board.

The thoroughbred stallion "Gray Eagle" was bred in Kentucky, and is now owned by WINTHROP W. CHENERY, Esq., of Belmont. He was got by "Gray Eagle"—he by "Woodpecker,"—out of "Ophelia" by "Wild Medley,"—and he by imported "Medley," dam by "Wildair,"—imported "Medley" by "Gimcrack,"—out of "Arminda" by "Snap,"—grand dam, "Miss Cleveland," by "Regulus,"—"Midge," by a son of "Bay Bolton,"—by "Bartlett's Childers,"—by "Honywood's Arabian," dam of the two "True Blues." Dam of "Gray Eagle" by imported "Trustee,"—he by "Catton," out of "Emma" by "Whisker,"—grand dam "Gibside Fairy" by "Hermas,"—"Vicissitude" by "Pipator,"—"Beatrice" by "Sir Peter,"—"Pyrrha" by "Matchem,"—"Duchess" by Whitenose,"—"Miss Slamerkin" by "Young True Blue," by Lord Oxford's "Dun Arabian,"—D'Arcy's black-legged Royal mare, grand-dam of "Gray Eagle" by "Columbus," (sire of "Eliza Bailey")—grand grand-dam by "Stockholder,"—he by "Sir Archy," by imported "Diomed,"—grand grand grand-dam by "Pacelot,"—he by imported "Citizen,"—dam, "Mary Gray" by "Tippoo Saib."

"Gray Eagle" is of a beautiful gray color, stands about 16 hands high, and is a horse of great symmetry and power. He had a good reputation as a running horse, prior to being trained as a trotter.

The beautiful Shorthorn cow "Mattie Newell" was bred and is owned by JOS. A. HARWOOD, Esq., of Littleton, Mass. She is red with a little white; and was calved April 25th, 1867. Got by "Sheridan," 6,179—out of "Eva," by "Backwoodsman," 226—"Ann Gwynne," by "Prince Albert," 853—"Daisy Second," by "Dandy," 50—"Daisy," by "King Charles Second," 84—"Dafodill," by "Sampson," (5,081)—"Young Daisy," by "Dandy," (1,900)—"———," by Wilkinson's bull, (2,838)—"———," by Greathead's bull, (3,936) etc.

The Caraman, or Fat-tailed Sheep, were imported from Karamania, in Asiatic Turkey, by W. W. CHENERY, of Highland Stock Farm, Belmont.

There appear to be many varieties of the fat or broad-tailed sheep found in Asia and Africa, and among naturalists they form a group by themselves. The tail, in some of these varieties or families, will weigh fifteen to twenty pounds; but in some of the larger kinds, when well fattened, it will weigh seventy, eighty, and, in rare cases, even so high as one hundred and fifty pounds. This overgrown appendage becomes often a great inconvenience to the animal. In the Syrian varieties it is less developed. The fatty deposit is oleaginous, of a consistence between fat and marrow, and is often used in place of butter. When the animal is young it is said to be equal to the best marrow.

Thanks are also due to the inventors and manufacturers of the ploughs and other implements illustrated in the Report, for the use of cuts designed to give some idea of the recent improvements in agricultural mechanics, as shown at the Trial of Ploughs at Amherst in May last, and at the Exhibitions of the County Societies.

It is worthy of the consideration of the societies whether the method, too often adopted, of awarding premiums on implements, without a practical trial on the field or elsewhere, is not, on the whole, productive of more harm than good. Some of the societies have already voted to discontinue this practice. To decide the comparative merits and value of many machines without a careful trial is simply impossible, and awards without such trial often mislead the farming community.

Many statements of crops are still too indefinite to be of general value, and such are necessarily excluded from this volume, when they might otherwise be of great value. The secretaries of the societies can do much to secure greater detail and accuracy of statement on the part of competitors for premiums.

CHARLES L. FLINT.

Boston, January 27, 1869.

OFFICERS OF THE AGRICULTURAL SOCIETIES.

1869.

MASSACHUSETTS.

President—GEORGE W. LYMAN, of Boston.
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Secretary—F. C. KNOX, of Blandford.

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Secretary—ALEXANDER MACY, Jr., of Nantucket.

MARTHA'S VINEYARD.

President—HERMAN VINCENT, of Chilmark.
Secretary—DAVID MAYHEW, of Tisbury.

AGRICULTURAL EXHIBITIONS.

1869.

Essex, at *Newburyport*,	September 28 and 29.
Middlesex, at *Concord*,	September 30 and October 1.
Middlesex North, at *Lowell*,	September 30 and October 1.
Middlesex South, at *Framingham*,	September 21 and 22.
Worcester, at *Worcester*,	September 23 and 24.
Worcester West, at *Barre*,	September 30 and October 1.
Worcester North, at *Fitchburg*,	September 28 and 29.
Worcester North-West, at *Athol*,	October 5 and 6.
Worcester South, at *Sturbridge*,	October 7.
Worcester South-East, at *Milford*,	September 28 and 29.
Hampshire, Franklin and Hampden, at *Northampton*,	October 7 and 8.
Hampshire, at *Amherst*,	September 28 and 29.
Highland, at *Middlefield*,	September 16 and 17.
Hampden, at *Springfield*,	October 5 and 6.
Hampden East, at *Palmer*,	October 12 and 13.
Union, at *Blandford*,	September 28 and 29.
Franklin, at *Greenfield*,	September 30 and October 1.
Berkshire, at *Pittsfield*,	October 5, 6 and 7.
Housatonic, at *Great Barrington*,	September 29, 30, and Oct. 1.
Hoosac Valley, at *North Adams*,	September 21, 22 and 23.
Norfolk, at *Dedham*,	September 23 and 24.
Marshfield, at *Marshfield*,	October 7 and 8.
Bristol, at *Taunton*,	October 5, 6 and 7.
Bristol Central, at *Myrick's*,	September 23 and 24.
Plymouth, at *Bridgewater*,	September 30 and Oct. 1, 2.
Hingham, at *Hingham*,	September 28 and 29.
Barnstable, at *Barnstable*,	October 5 and 6.
Nantucket, at *Nantucket*,	September 29 and 30.
Martha's Vineyard, at *West Tisbury*,	October 19 and 20.

AGRICULTURE OF MASSACHUSETTS.

HISTORY OF THE ESSEX COUNTY AGRICULTURAL SOCIETY.

From an Address before the Essex Agricultural Society.

BY GEO. B. LORING.

The progress which Essex County has made during the lifetime of this society should not be forgotten; nor should the growth of that country of which it forms a part, and in which its intellectual and physical activity has had so large a share. In 1818, when the organization of this society first occurred to Timothy Pickering, the republic to whose existence he had devoted all his early powers had hardly commenced its career of prosperity. It had just come out of an exhausting war—its second struggle for position among the nations of the earth. A narrow strip of land between the Atlantic and the Alleghanies contained nearly all its valuable and productive industry. The great cities of the West were unknown; the valleys and prairies were lying idle; the coal-fields were unexplored; the mineral wealth of the Pacific slope was unheard of; manufactures were in their feeblest infancy; and the most vigorous commerce under the American flag was carried on by the citizens of Essex County, who poured the wealth of the great fishing grounds, and of Ormus and the Ind, into the diminutive harbors of Salem and Marblehead and Newburyport. The entire revenue of this country was then less than $30,000,000 annually. Prosperous as Essex County was in that early day, paying nearly one-seventh of the entire State tax, she had less than 70,000 inhabitants, had no manufacturing nor mechanical interests, had not a steam-engine within her limits, had not a cotton mill, and but two woollen mills, so far as I can ascertain, and depended entirely upon agriculture and commerce for her growth and prosperity. North of the Merrimack River, in the now thriving towns of Lawrence, Methuen, Haverhill, Amesbury and Salisbury, there were then less than three thousand inhabitants; Lynn was but a village; Salem a small commercial town; a few baggage wagons transported all the merchandise in the county, and a few stage coaches all the travellers who depended upon public conveyance.

It was in this condition of affairs in the country and in this county that "a meeting of farmers and others, inhabitants of the county of Essex, was held at Cyrus Cumming's tavern, in Topsfield, on Monday, the sixteenth of February, in the year of our Lord one thousand eight hundred and eighteen, for the purpose of forming an agricultural society for the county of Essex."

It seems to me proper that we should here pay a just tribute to the most conspicuous of those officers of this society, who, by their distinguished public service, have recorded their names in the history of our country.

Foremost among these in point of time and of illustrious public service stands Timothy Pickering. His patriotic career is known to you all. Commencing with his gallant resistance to British aggression at the North Bridge, in his own town of Salem, a successful armed resistance made two months before the stand at Concord, he served his country through the war of the Revolution in military life, and through the administrations of Washington and Adams in civil service. Bold, honest and uncompromising, he represented all that stern and defiant purpose which characterized the founders of our government. No personal considerations ever controlled his public action. Regardless at all times of popular clamor, perhaps too defiant of the revolutionary thought of his time, he pursued his stern and steady way through life as a statesman, and at last sought repose as an intelligent, practical farmer on his native soil. It is for others to record his important service as a public servant during the most trying days of our republic; but it is for us to remember that he was one of the pioneer farmers of this county; that he was one of the most accurate of our early agricultural investigators; and that during the ten years of his presidency he filled the records of this society with his sound practical observations and his wise inferences. It was said of him, at his death: "How much the society is indebted to his exertions is well known to all acquainted with its operations. His high reputation, his knowledge of agriculture and zeal for its advancement, combined with a readiness and happy talent in communicating information, either orally or in writing, enabled him to render probably greater services than would have been in the power of any other individual." "It may be mentioned, as an instance of his zeal for the society, that, but a few weeks before his decease, he wrote the memorial, presented on their behalf to the legislature, for a continuance of the grant to the agricultural societies of this State." His presidency extended from 1818 to 1828, and was the last public office held by him. The memorial presented by this society to the family of Colonel Pickering, after his decease, was a tribute of respect and regard alike worthy of himself and of those whom he had so long and so faithfully served. And his farm at Wenham, where he applied those principles of agriculture which he so carefully investigated, now bearing the marks of his industry, reminds us ever of his devotion to the cause, and of the peaceful years which closed his long and useful life.

Passing from the distinguished founder of our society along the line of worthy presidents, Howes and Mosely and Duncan and Kittredge, I come to the name of one whom many of us remember as the genial gentleman, the fervid orator, the honest statesman, the pacific lawyer. The sixth president, Leverett Saltonstall, was one of the most admirable, and stands nearest in our history to the first and greatest. "Pickering and Saltonstall," said Mr. Daniel P. King, in his eulogy of the departed statesman, "worthy names, worthily associated; no encomium of ours can add one green leaf to their ever-fresh chaplets; their deeds, their talents and their virtues have secured for them an enduring fame." And he adds: "Descended from a Puritan family, Mr. Saltonstall made an honored name more honorable; of New England stock, he was worthy to represent the stern virtues of New England; they were his pride and his only boast. Truth, honor and virtue he worshipped always, not because of the sure and adequate reward which they pay, nor because it is fashionable occasionally to make a pilgrimage to their altars, but because for their own sakes he loved truth and honor and virtue. The beautiful language applied by President Kirkland to Fisher Ames is no less true and beautiful when applied to Mr. Saltonstall: 'Happily he did not need the smart of guilt to make him virtuous, nor the regret of folly to make him wise.' Liberty, religion and holiness he loved, and his reverence for God was habitual and controlling."

Mr. Saltonstall won high honors in the State and in the nation; and death alone, which laid its icy hand on him before he had reached old age, prevented his attaining still higher position. He was president of the society from 1842 to 1845. Of those who succeeded him in office, three have passed away—Newell, Adams and Fay—all eminent in agriculture, and all recipients of heartfelt eulogy from their associates here after they had left their fields of labor.

Of the presidents of the society there are now living, James H. Duncan, president from 1836 to 1839; John W. Proctor, president from 1845 to 1852; Allen W. Dodge, president from 1861 to 1863; Joseph How, president from 1863 to to 1865; William Sutton, president, chosen in 1865.

Stepping out of the list of presidents, I find one name among our secretaries, whose fortunate public career, cut off as it was by premature death, made him peculiarly conspicuous. It is hardly necessary that I should say that I refer to Daniel P. King. Mr. King possessed that rare combination of faculties which secures for its possessor the reputation of being specially favored of fortune. Passing most of his life on his secluded farm, he was a careful observer of public affairs; and when brought into the work of a servant of the people, his prudence, good judgment and sound information gave him peculiar advantages over the more ambitious and restless. I think one of the most eloquent and appropriate tributes ever paid by one public man to another, was that pronounced by Caleb Cushing, in his allusion to the death of Mr. King, at the annual meeting of this society in 1850, when he says of him: "He owed to the accidents of birth and circumstances but this—that he was enabled to pass into the public service without going through that apprenticeship in active life, or training in the learned professions, which, though it sharpen the faculties and enlarge the sphere of knowledge, yet has a tendency to leave the heart hardened in the conflict of human passions and interests, and the mind sophisticated by the habit of seeking for arguments to maintain an assumed opinion or side, in the stead of the unprejudiced exploration of the depths of supreme and eternal truth. In this he was favored by fortune; the rest was all his own—opportunities of education and mental formation faithfully improved, scholarly accomplishments, a graceful and ready eloquence, courteous bearing, candor of judgment, a spirit manly and generous, firmness of tenet softened by moderation of temperament, justness of principle, philanthropy in sentiment and practice, not in loud profession, religion of the heart as well as of the head and of the outward life, equableness of general worth, constancy and uprightness in the performance of all his duties, whether to himself, his country or his God."

Mr. King was secretary of the society from 1842 to 1844, and was one of the vice-presidents from 1848 to 1850, the year of his death.

The secretaries of the society have been: David Cummins, 1818; Frederick Howes, 1819; John W. Proctor, 1820–42; Daniel P. King, 1842–44; Allen W. Dodge, 1844–61; Charles P. Preston, 1861.

Of these, David Cummins, Frederick Howes and Daniel P. King are deceased. I am happy in this opportunity to pay a just tribute to the long and valuable service of Mr. Proctor, both as secretary and president. And I know you will join me in expressions of sympathy for those infirmities which have visited his old age, and render his enjoyment of this day, so rich in memories to him, impossible.

When you consider the character of those who organized this association, you will not be surprised to learn that the preparation of addresses and essays upon agricultural subjects formed an important, and for some years the only duty, in which its members were interested. Colonel Pickering began, continued and ended his connection with the society by constant and diligent labor with his pen. His example has been well followed, and, while our volumes have been filled with essays by practical farmers, the annual addresses, invariably delivered by a citizen of the county, form an interesting and useful part of our agricultural literature.

The first address was delivered by Timothy Pickering, May 5, 1818, upon "Manure; Domestic Animals, or the live stock of a farm; Green Food, comprehending carrots, the great beet, or mangel wurtzel, the Swedish turnip and Indian corn plants while abounding in sweet juices; Ripened Indian Corn and Wheat"—a large field to be tilled, it seems to me, in one day. He says, "My own practice since has been conformed to this conclusion: diligently ploughing in all manure as soon as spread, even so far as to spread in the morning no more than could be ploughed in before the hour of dining, and while the cattle were eating to spread only so much more as they could plough in by night." "I am induced to think the spreading of dung on grass land the most wasteful way in which it can be used." Of cattle he says, "I would inquire whether giving rewards for the *biggest* and the *fattest* is the best method of obtaining the *most valuable* breeds." "In fattening cattle and sheep there is a point to be attained at which their flesh will be of the best quality and most valuable to the consumer. Is not all beyond this a waste of time and expense in their keeping?" He says in the same address that Swedish turnips should be sowed early in May; and that no green food "will afford butter of equal excellence" with that produced by green corn fodder—two points in which farmers of this day would differ from him.

Again, on February 21, 1820, Col. Pickering addressed the society, in accordance with a vote of the trustees. He discussed deep ploughing and manuring, root crops, Indian corn and winter wheat, live stock and orchards—giving his views on these subjects with wisdom and practical good sense.

Andrew Nichols was the next orator. He delivered the address at Topsfield, October 5, 1820, in which he urged the farmers who listened to him to "cultivate no more land than can be thoroughly ploughed, well manured at once, and kept free from weeds." "Never keep land many years under the same crops." "Never lay land into grass except it be well prepared and in very rich condition."

October 17, 1821. Rev. Abiel Abbott, one of the soundest thinkers of his day, and one of the most careful scholars and patrons of letters, stepped down from the pulpit, and, in an address delivered at the annual exhibition at Danvers, declared that "Every attentive farmer has doubtless observed that the best manure is taken from under cover, from his sheep or cattle shed, from his barn cellar. This should be an inducement to make manure as much as possible under cover. Economy should induce us to make cellars under our stables." He said furthermore, "Every farmer perceives a great difference in the breed of cattle, sheep or swine; that a poor ox, cow, sheep or hog is not so easily kept, nor so profitable, as a good one."

October 2, 1822. Rev. Peter Eaton, another of the strong-minded and strong-bodied clergymen of that day, delivered an address at Topsfield, in which he set forth that "it is a maxim in husbandry that no scheme of management is of advantage to the community which will not give a profit; and that is the best which will afford the greatest profit with the least labor and expense."

The year following, October 6, 1823, it fell to the lot of Hon. Frederick Howes to address the society. And he did it well, for he declared that "an essential requisite of good husbandry is that the soil should be kept free from weeds." And no one disputed it. He also urged the cultivation of root crops.

Reports of committees for 1824 were published in the "New England Farmer." In 1825 no address seems to have been delivered. In 1826 and 1827 the reports were published in the "New England Farmer."

On September 25, 1829, Col. Pickering was again called on to address the society, the annual address having been omitted since 1823. In this, his last appearance as a teacher of agriculture, he spoke of ploughs, and said with much truth, "It is not so much the *weight* as the *shape* of a plough which makes it of easier or harder draft; and this depends chiefly on the mould board." He also urged keeping manure "under cover." He says, "Many years ago I became satisfied that the hilling of Indian corn was at least useless; I was rather inclined to think it injurious."

The orator for 1830 was Hon. James H. Duncan, who is still one of the active and useful members of the society. He announced, with justice, that "there is the same and equal occasion for discernment, good judgment and intelligence in the business of husbandry as in the other employments of life." He favored small farms and systematic husbandry; urged careful education in agriculture, and recommended "good tools."

Rev. Henry Colman delivered the annual address at Andover, September 29, 1831. This was one of Mr. Colman's earliest efforts in that cause to which he devoted so usefully the latter years of his life. In this address he stated that "ploughing is too deep when it buries all the richer parts of the soil, and brings to the top only a cold and gravelly substance, unless you have manure in such abundance that you can create a new vegetable surface." He says, "Late ploughing in the spring is preferable to early." Quotes from Curwen, that "by making use of dung in its freshest state the farmer may extend his cropping to one-third more land with the same quantity of manure."

Rev. Gardner B. Perry spoke at Newbury, at the exhibition, September 27, 1832. He approved of the society, as having a tendency to remove some of the hindrances to agricultural improvement—such as an "unsettled state of mind," an "impression that farming is not a genteel occupation," and an idea that "learning is of little advantage in the business of a farmer's life."

Dr. Jeremiah Spofford was the speaker at New Rowley (now Georgetown,) September 26, 1833. He said, with truth and emphasis, "To no class of men does this necessity of constant industry apply more forcibly than to the farmer. He turns his own wheel of fortune more emphatically than almost any other class; those great and sudden turns of fortune which sometimes raise or depress others, lie quite out of his track. With firm foothold he climbs the ascent to wealth, or with loosened energies he slides down the gradual descent to poverty."

Hon. Ebenezer Moseley ascended the rostrum at New Rowley, September 25, 1834. He urged agricultural education; spoke of the advantages of Dummer Academy as an agricultural school; dwelt upon the proper time to cut timber, and recommended the cultivation of fruit.

Hon. Daniel P. King delivered the annual address at Danvers, September 30, 1835. He put forth the idea that "the great object of the farmer is to obtain the most valuable products with the least possible labor, and at the same time to keep his farm in a state of progressive improvement;" and he recommended "that a farmer should use his eyes as well as his hands."

Hon. Nathan W. Hazen was selected as the orator at Danvers, September 28, 1836. He spoke of the importance of agriculture, and stated in striking phrase, that "When agriculture loses the services of youth, and they desert its fields for other employments, it is as though spring should be struck from the seasons of the year, or should forget to bloom." He recommended "the adoption of system in husbandry," as apt to induce that minute attention and close observation on which its success so much depends.

Rev. Nathaniel Gage addressed the society at Topsfield, September 27, 1837. He laid down some valuable rules of husbandry, and said: "A prominent difficulty, in advancing a general improvement in the husbandry of the great body of farmers, arises from an attachment to existing usages and a dread of innovations."

Rev. Leonard Withington spoke at the exhibition at Topsfield, September 27, 1838. He advanced the idea that "we must bring our manners and our political theory into more harmony. Our creed must sanction our practice, and our practice must be in conformity with the spirit of our creed. We must not attempt to put new wine into old bottles, else the bottles break and the wine runneth out and the bottles perish; or, in plain language, the republican spirit must be put into republican forms; and we must be content to take the system, the whole system, with all its blessings and attendant evils." Sound agricultural doctrine.

Rev. Allen Putnam was the speaker at Georgetown, September 26, 1839. Said he: "I have a few words for the farmers' wives. However skilful, industrious and prudent your husbands may be, their success in money-making depends as much upon you as upon them." Does any farmer doubt this?

Hon. Asahel Huntington, the orator for 1840, at what place the Transactions do not inform us, declared that "to secure an increased and increasing production, *manure* is the great and principal instrumentality. This is the beginning, the middle and the end of thriving husbandry."

Alonzo Gray, A. M., the speaker at Georgetown, September 29, 1841, proclaimed "that in order to secure constant progress and permanent improvement in agriculture, its principles must be made a regular branch of study in an extended course of an English education."

Hon. Allen W. Dodge, at Andover, September 28, 1842, encouraged the fruit-growers of this county with the declaration that "the apples of Essex may yet be as widely celebrated as the oranges of Havana." He also stated, with much good judgment, that "extensive cultivation of root crops is the basis of good husbandry in Great Britain, and I see no good reason why it should not be with us." He urged "the personal visitation of farms that are distinguished for good management in general or for excellence in any specific department."

Hon. Leverett Saltonstall, speaking eloquently at Andover September 27, 1843, said, in defence of agricultural societies: "No one now opposes or attempts to cast ridicule on these associations, which are spreading over our broad land, and whose good effects are seen in improved cultivation, not only in our own blessed New England, but in the States of the far West; and their light has broken in upon those less-favored regions, where labor is not held in that honorable estimation which it must enjoy before a community can be truly prosperous."

Hon. John W. Proctor, the appointed speaker at Salem in 1844, said well, "As soon should I expect a man to be skilful in the management of a ship who has never been upon the water, or expert in chemical experiments who had never been in a laboratory, as to understand the necessary processes of farming without actual personal experience in them." "Cultivate," said he, "so much land as can be well done, and no more; and leave no part of the process of cultivation slightly performed."

Rev. Edwin M. Stone delivered the address at Ipswich, September 24, 1845. He said, in a long and elaborate document, "It has always seemed to me a reproval to the farming interests of this country that it should depend on foreign supplies of improved stock, when it can easily be supplied at home." Not so easily as some might suppose. He stated that "good pasture is as essential to the best results of the dairy as it is to the best appearance of stock;" urged soiling milch cows, and expressed the opinion that "the product of a single acre will suffice for ten or fifteen cows, and give them their fill."

Hon. Moses Newell was the orator at Lynn, October 1, 1846. He said, "All manures mixed with earth, for top-dressing or ploughing-in, should be composted in reference to the soils to which they are to be applied." A good idea, and one which should not be forgotten. He said, too, "a barn cellar under the stalls is the best storehouse" for manure.

Thomas E. Payson, Esq., gave the annual address at Lynn, September 29, 1847. He spoke of the value of the newspaper press. "Slowly and silently, almost by stealth, without the knowledge of the man himself, this mighty engine undermines old prejudices, and has taught the farmer that however independent he may be, he is not so much so as that the experience of others will not profit him. Most of us have become willing to seek directions, even if they are contained in a book. We are becoming more like liberal, free-born, aspiring men."

Josiah Newhall, Esq., addressed the society at Lynn, September 28, 1848. He thought "the great stumbling-block in the way of agricultural improvement has been the want of a knowledge of the vegetable economy of the structure and growth of plants. Did farmers fully realize the indispensable necessity of supplying food to plants to promote their growth, that they do to feed animals, we should immediately see the commencement of an improved husbandry."

Hon. Asa T. Newhall, the orator of the society, September 26, 1849, at Danvers, recommended the reclamation of "wet meadows and swamps when the mud or peat is from two to ten feet in depth," rather than those "where the plough would run to or near the hard pan beneath." He spoke of the necessity of curing salt hay properly; said "the willow on low, marshy land will rather improve the grass than otherwise, and afford a large quantity of wood, it being of rapid growth."

Hon. Caleb Cushing was the orator at Salem, September 26, 1850. He said, "In proportion as productive land is abundant, and easy of acquisition by all the members of the community, will society be sound on the main point, that is, the absence of either serfdom or pauperism and of the criminal classes created by the unequal distribution of limited national wealth." True.

Rev. Milton P. Braman spoke before the society September 25, 1851, at Salem. He dwelt on "the oppressed condition of many who have cultivated the soil;" declared that "to insure a more rapid improvement in agriculture the system of tenantry must be abolished, and the cultivator must be the owner of the soil;" and that "the want of chemical knowledge" has "retarded the advancement of agriculture." He recommended the foundation of agricultural schools.

Hon. Henry K. Oliver addressed the society September 30, 1852, at Lawrence. "Let me then commend to you books on farming," said he, "and the farming of books." "And of education, as the bringing-out of the man into all possible physical, intellectual and moral perfectness,—for that is education,—may your tongues and mine never cease to speak in terms of highest honor."

Hon. Joseph S. Cabot, in addressing the society at Lawrence, September 29, 1853, said, "Agriculture, like every other science, is one of progress, and that, too, in accordance with the greater or less advancement of society." He also adds, "Whatever means may be adopted for the purpose, one rule with respect to cultivation may be safely laid down as an established axiom, and that is, that no land will produce a remunerative crop unless it contains, or is made to contain, an adequate supply of vegetable nutriment, the labor of cultivation remaining under all circumstances nearly the same." His speech was a valuable essay on fruit culture.

R. S. Fay, Esq., spoke at Lawrence, September 28, 1854. He urged the use of labor-saving machines and a liberal supply of manure. He said also, "The establishment of regular markets or fair-days throughout the county, at the most accessible points, would be a very great advantage to a farming community like ours." He proposed the planting of forest trees and the protection of birds.

Dr. James R. Nichols, who delivered the address at Haverhill, September 27, 1855, dwelt upon the value of agricultural chemistry. He discussed the qualities of various kinds of manures, and added, "I have said enough, I trust, to accomplish my object, which has been to show the husbandman how intimately connected is chemistry with his vocation, how much he has learned from it, and how much it is able to teach him."

Ben. Perley Poore, Esq., delivered the address at Newburyport, October 2, 1856. It was an interesting historical sketch of the agriculture of the country from the earliest days, and an appeal for improvement. "Cherish, then," he said, "arboriculture and horticulture, each cultivator resolving to improve, and storing his mind with the scientific studies of the learned, the experience of the experimentalist, and above all with the results of his own practical observations."

Dr. E. G. Kelley spoke at Newburyport, October 1, 1857, stating, with propriety, that "the society and its exhibition might well be called industrial." His essay on Society contained many valuable hints. "By early marriage," said he, "the chances are that a greater number, in the aggregate, enter this state than otherwise would. If deferred, disappointments of various kinds may finally prevent it." And he says, moreover, "The first and great motive to be urged upon the owner of the farm-house is to secure thereto the attachment of his children."

Dr. George B. Loring delivered the annual address at Danvers, September 30, 1858. He spoke of the importance of agricultural societies, and of the value of practical knowledge. He said, "The best professor of agricultural chemistry is he who comes embrowned from the compost heap, which by judicious application has forced a hundred bushels of corn from each of his well-cultivated acres. The best teacher of the art of tilling the soil is he who has by long experience become acquainted with the habits of plants, from their tenderest infancy to the ripened harvest."

J. J. H. Gregory, Esq., addressed the society at Danvers, September 30, 1859. He said, "My principal object on this occasion is to draw your attention to the importance of correct observation and thorough experiment to the farmer, with reference to the elevation of his nature and the improvement of his calling."

Rev. John L. Russell was the speaker at the annual exhibition at South Danvers, September 26, 1860. Dealing with agriculture as an art, he said, "But no art can successfully be pursued without a science to aid and assist, to prompt the labor and to point out the course."

Hon. Alfred A. Abbott was the orator of the society at South Danvers, September 25, 1861. He recommended strongly the careful keeping of farm accounts, and eulogized agricultural education. He said, "In the next place, and of equal, and perhaps greater importance, the young man who is to become a farmer should at once feel and realize that the occupation upon which he is entering is not a mere mechanical routine of labor; that while it is one which may require severe physical toil, it also calls for and demands the exercise of the highest intellectual faculties."

George J. L. Colby, Esq., addressed the society at Georgetown, October 1, 1862. He spoke on "The Relations of Man to Agriculture," and said, "Man's progress in civilization has been and must be through the paths of agriculture; that comes first as the foundation of society." He said also what I suppose we are all ready to believe here, that "the majority of great minds from the beginning of time have come from rural life."

Hon. Daniel Saunders, Jr., addressed the society at Andover, September 30, 1863. He declared, "It is a mistaken idea that for successful field labor merely physical training is required." "What is wanted by our farmers is an education that shall not only accumulate facts, but which shall enlarge the mind, develop the powers of the brain, widen and deepen the channels of information, and bring into operation those latent elements of mental perception and concentration."

Hon. Darwin E. Ware delivered the annual address at Lawrence, September 28, 1864. He stated: "But it is not enough that mechanical and manufacturing industry supply the implements, the markets, and the general conditions necessary to a self-sustaining and improving agriculture. The true principles of such an agriculture must be investigated, inculcated and diffused. This necessity has been most emphatically recognized in the liberal grants of land Congress has made for the establishment of agricultural colleges. Such a measure is of good import."

Nehemiah Cleveland, Esq., was the orator of the society at Lawrence, September 27, 1866. He remarked, "I do not hesitate to say that these addresses constitute a valuable body of learning and counsel, specially designed indeed for the farmer's advantage, but broad enough to be of service to us all." Some of us will undoubtedly agree with him. He also says, "To form a system in agriculture, as in anything else,—to deduce and lay down rules,—we must first collect facts. But this alone is not enough. Unless the observations are of the right kind and made in the right way—unless they are exact and accurate, so conducted and so reported as to admit of proper arrangement and comparison—they will avail little, and may even lead to confused and mistaken notions."

Hon. Otis P. Lord spoke before the society, at Haverhill, September 26, 1866. He said: "It has seemed to me that now, just as we are emerging from this terrible conflict, there can be no fitter subject for an hour's consideration than the nature, object and purposes of good government, with special reference to our own and its institutions." And so he spoke of government.

Rev. R. H. Seeley, D.D., addressed the society at Haverhill, September 25, 1867. He said: "Let him, therefore, who has a farm in any district of New England, which equals the average for fertility and advantages of position, hold it, as the safest form in which his property can be invested, and work it with that thought and skill which are the guarantee of fair returns, remembering, meanwhile, that not the ruler of the State nor the proudest merchant upon 'change is so independent as himself of the crises and changes which, whether by violence or the operation of steady laws, occur so frequently in the social and political affairs of the country." At the same time he adds, "In this connection the suggestion may be worth heeding, that the New England farmer should not expect too large profits from his farm."

A peculiar interest attaches to these addresses, from the fact that they are all the efforts of citizens of Essex County, of men conversant with the wants and purposes of this locality, and familiar with the questions and objects of importance among us in their own day. And they indicate most creditable ability in those various walks of life from which their authors have been taken.

But not in addresses alone has the agricultural thought of this county been engaged for the last half century. The example set by the distinguished first president has been followed to this day. The practical essays, more or less elaborate, of Timothy Pickering, numbering in all nearly two hundred, form a part of the most valuable literature of the society. In this work he had many followers. The "statements," as they were called, of farmers who entered their stock and crops for premium, are highly interesting and instructive. And the reports of committees, with these "statements," and the addresses, composing nearly all there is of the early published transactions, constitute a reliable and valuable fund of information. Among these papers may be found the admirable farm report of Henry Colman, in 1830—the commencement of that series of papers written by him on farm stock, on corn, on exact and experimental agriculture, on swine, on the dairy, on agricultural publications, on cutting and preparing feed, on Essex County agriculture, for which the farmers of this county will always hold his name in grateful remembrance. The reports upon the mulberry-tree and silk culture, commencing with Edward Mosely's paper, in 1830, containing Gardiner B. Perry's long and elaborate essay on the same subject in 1831, Mr. Mosely's second essay in 1833, Mr. Perry's again in 1834, and the report of Temple Cutler, in 1840, form an interesting chapter in the history of that curious attempt to introduce Italian industry upon the soil of New England. The writings upon cattle, by Hectar Coffin, who, in 1830, declared that "Essex County is adapted to the breeding of cattle, but to a very limited extent;" by R. A. Merriam, on the diseases of animals; by John W. Proctor, treating of cattle for New England farms; and by numerous practical and sensible judges acting as committees at the exhibitions, may be consulted with advantage by all who desire information on this valuable branch of agricultural industry. Our attention is particularly attracted by the report made by John Torrey, of Newbury, with regard to the cost of keeping a cow from February 5 to September 28, 1831, as follows:—

Half a ton of salt hay, ...	$2 00
45 bushels of small grain, ...	2 87
Stalks and suckers from 195 rods of land, . . .	3 00
One bushel of potatoes, ...	20
Pasturing from August 5 to September 28, . . .	1 00
Total, ...	$9 07

An account worth remembering in these extravagant days.

In this enumeration I have given only a part of the intellectual labor which has been bestowed for the honor of this society and for instruction in the art of agriculture. Page after page of our Transactions is filled with short reports of committees, concise statements upon crops and cattle and manures, and processes of cultivation, and grass, and fruit-trees, containing hints and facts by which the farmer may be guided in his business. But not only for the information which it contains is this long record of fifty years of agricultural thought valuable and interesting, but for its significance as the product of an intelligent, inquiring and educated community. A prize animal in the stall, premium crops on the acres, indicate a skilful devotion to agriculture which all practical men respect. A thoughtful essay upon this animal or crop indicates an intellectual ambition which we all admire. It tells of schools and books, and studious hours, and diffusion of knowledge, and social respectability, and civil elevation, and all the moral advancement which attend upon popular freedom and the institutions of an enlightened people. It tells of prosperous and progressive agriculture.

Of the practical operations of this society, of the premiums it has awarded, the plans of improvement it has designed, there is a long and honorable record, which I should be glad to lay before you in all its details; but I must content myself with some of its most prominent features.

The encouragement of well-managed farms was one of the early objects of the society; and I am sorry to say it is an object which has met with indifferent support from our farmers. For many successive years there have been no entries in this class, and a vast amount of information has been lost from the unwillingness of farmers to submit their operations to the inspection of committees of the society. I trust, as our ambition increases and our agriculture improves, this reluctance will be wholly removed.

The farms which are recorded as having received the first premium are those of Jesse Putnam, of Danvers, in 1824; Moses Newell, of Newbury, in 1826; Jacob Osgood, of Andover, in 1829; Erastus Ware, (the Pickman farm,) of Salem, in 1830; Matthew Hooper, of Danvers, in 1831; Thomas Chase, of West Newbury, in 1832; Daniel Putnam, of Danvers, in 1835; Joseph How, of Methuen, in 1837; Christopher How, of Methuen, in 1845; Leaverett Bradley, of Methuen, in 1849; J. F. Winkley, of Amesbury, in 1850; W. F. Porter, of Bradford, in 1851; Samuel Raymond, of Andover, in 1858; Geo. B. Loring, of Salem, in 1862; and Richard Webster, of Haverhill, in 1867. There are many others which have received second premiums and honorable mention, and among them will occur to you the farms of Daniel P. King, of Danvers, Isaac Osgood, of Andover, William Thurlow, of West Newbury, Joseph Kittredge, of Andover, and E. Hersey Derby, of Salem. I trust the chronicler of the next half century will have a longer list to record than I have found in the past.

Turn now with me to the exhibitions. The first of these meetings was held at Topsfield, October 5, 1820. The amount of money offered for premiums was $182. There were four classes: 1st. Working oxen and neat live stock. 2d. Fat oxen and swine. 3d. Indian corn and potatoes. 4th. On manures. The first yoke of oxen which had the honor of taking the first premium in the county belonged to Samuel Wheeler, of Newburyport. The first prize bull belonged to Asa Andrews, of Ipswich, and he received the premium as a "dark brindle bull."

The first cow taking a first premium in the county belonged to Jacob B. Winchester, of Salem. The best bull-calf of that day was owned by Jonathan Berry, of Middleton; the best heifer-calf by Simon Smith, of Saugus. There were no fat oxen on exhibition.

The best boar of the day belonged to George Adams, of Newbury; the best sow to Elias Putnam, of Danvers; and the best litter of pigs to Elias Putnam.

Tristram Little, of Newbury, took the first premium on a corn crop, having raised 103½ bushels on one acre of ground; and John Dwinell, of Salem, took the first premium on potatoes, having raised 398½ bushels to the acre.

Two communications on manures were received—one from Benjamin T. Reed, of Marblehead, and one from Asa Andrews, which were published with the "thanks" of the trustees.

Joshua Lovett, of Beverly, received the first premium on the dairy, having made 502 pounds of butter and 750 pounds of cheese from five cows, between the first day of May and the last day of November; and the premium was awarded, as the committee say, "inasmuch as the object of this society is to encourage judicious efforts in agricultural improvements," there being but this one entry.

The first premium for ploughing was awarded to Timothy Pickering, on account of the superior performance and superior utility of his plough; and the second premium was given to Gorham Parsons, of Byfield. Col. Pickering's plough was made by Henry Borden, at Utica, N. Y.

In 1821, the premium list consisted of offers for management of a farm, green crops for cows, Indian corn and other crops, sumac, the dairy, cider, live stock and forest trees.

Premiums for domestic manufactures were first offered in 1822, and the women of the county were enlisted in the enterprise.

It was not until 1832 that premiums were offered for horses, and as follows:—

For the best horse raised in the county, not less than three nor more than five years old, . . .	$20 00
For the second best, ...	15 00
For the third best, ...	10 00

In their report, the committee say, "They regard the improvements in the breed of horses as an object of utility and importance; * * * and their value and beauty should excite more attention than has hitherto been given to the rearing of them in this county." There were many entries; and the first premium ever given to a horse by this society was bestowed on the iron-gray colt, three years old, of John O. W. Brown, of Newbury.

In striking contrast with the simplicity and necessary smallness of the early premiums offered, stands the liberality of the last. In 1857 the society paid $1,111.50 in premiums, as follows:—

Farms, &c., ...	$299 00
Farm stock, ...	324 00
Farm produce, ...	488 50

The manner of conducting the exhibitions has not changed since the first show was held at Topsfield.

The introduction of improved breeds of cattle in the county by members of the society has been carried on with liberality and energy. E. Hersey Derby, of Salem, and Gorham Parsons, of Byfield, were among the early importers of what were called Durhams in their day; the Alderney was introduced by Col. Pickering, in 1825, and in later years by C. G. Loring, R. S. Fay, R. S. Rogers, and others. Ayrshires were imported in 1846 by William S. Marland, of Andover, and Charles A. Stetson, of Swampscott, and by Geo. B. Loring in 1858. An Ayrshire bull was consigned to Moses Newell, of Newbury, by the Massachusetts Society in 1857, and Dutch cattle were introduced by William A. Russell, of Lawrence, in 1865. The improvement of stock in the county is now evident, and the "dark brindle bull," which took the first premium in 1820, would stand a small chance in these days, especially under the society's offer for the "best full-blood bull."

I have no doubt, and you have none, that all this effort of the society, which I have recited to you as much in detail as time will allow, has promoted the cause of agriculture among us, and has encouraged us to overcome those difficulties which arise from a hard soil and climate; and yet it is interesting and instructive to look back and see what crops our fathers raised, when this society was yet in its infancy. I have already spoken of Tristram Little's corn crop of 103½ bushels to the acre, and now let me give you a statement, made in 1829, of the crops which had then been raised at different times in different parts of this county:—

Of wheat, 24 bushels and 26 bushels to the acre.

Of Indian corn, 70 bushels, 72 bushels, 77½ bushels, 90½ bushels, 93¾ bushels, 105 bushels and 6 quarts, 110 bushels, 113½ bushels, 115 bushels, 117¼ bushels.

Of barley, 50 bushels, 51½ bushels, 52 bushels and 18 quarts.

Of potatoes, 518½ bushels.

Of carrots, 849 bushels, 864 bushels, and 878 bushels, at 56 pounds to the bushel, and 900 bushels.

Of mangold wurtzel, 924 bushels, and 1,034 bushels.

Of ruta-baga, 688 bushels.

Of beets, 783 bushels.

Of English turnips, 636 bushels, 687 bushels, 672 bushels, 751 bushels, 814 bushels.

Of onions, 651 bushels.

"We know of a lot of six acres from which thirty tons of hay, accurately weighed, were gathered in one season; and another field of about forty acres, from which, according to the statement of respectable and disinterested individuals, the yearly crops have averaged more than 120 tons, or three tons to the acre. We can point to a small dairy establishment the produce of which, when all circumstances are considered, is probably not surpassed in the State, when some of our native cows, with no extra feed whatever, have averaged a yield of 100 pounds each of butter in a season; and another when, with high feeding, five cows have produced 208 pounds in a season to a cow." This statement was, I think, drawn up by Col. Pickering.

We shall not find it easy, gentlemen, to exceed such crops as these. If we, as farmers, win for ourselves as honorable a record, we shall do well. But we can remember with satisfaction that in our day we have added to the business of general farming, which produced the extraordinary crops above quoted, the careful and profitable culture of the crops then but little known. Since that day the great business of root crops has been made by us a most important source of revenue. The onion has been brought to a greater degree of perfection. The cabbage crop has been made very profitable. All market gardening has been largely developed. Fruits of every description, for which in 1829 no premiums were offered by the society, have become a most interesting and useful branch of agricultural business; and the pear, the apple and the grape have been vastly improved by the intelligence and skill of our cultivators. The condition of our farm buildings has vastly improved. Our farm-houses are constructed with more economy and taste; our barns are more convenient; and a barn-cellar as a receptacle for manure has become the rule instead of the exception. Well-ordered estates, which were then rare, are now numerous. In and around our large cities the prosperous merchants and manufacturers have taken pride in beautifying their grounds according to the best rules of landscape gardening; and our beautiful sea-coast is adorned by the hand of man, to a degree hardly surpassed in any other region of the Old World or the New.

And while this narrow spot marked out for us as Essex County has grown in years, how has she increased in wealth and population, and in all the memories and deeds which make a people great! We contemplate her growth with pride, from the day when fifty years ago Timothy Pickering called a few enterprising farmers about him to consult upon what was then the great business of our people, down to this hour, when her teeming and busy population hardly find rest from their incessant toil. Within the lifetime of this society, Lawrence and Lynn, and Newburyport and Salem have sprung into existence as cities; Haverhill, and Gloucester, and Marblehead, and Amesbury, and Peabody, and Danvers, and Andover and Georgetown have become large towns—some of them have been born. The products of our industry have reached the fabulous sum of nearly eighty-two million dollars annually! Schools have multiplied in greater ratio than the increase of population; libraries and institutions of learning and religion have grown up on every hand. The early benefactions which made the name of Phillips and Bartlett illustrious among us have been eclipsed by the larger bounties which Peabody and Heard have bestowed on their native county. And while the founders of this society could look back over a refulgent history of statesmanship and scholarship and patriotic valor,—recalling the memory of their own sons who fell in the early days of the revolution; the gallant deeds performed by the men of Essex on land and sea in the subsequent war; the courage and wisdom of their own Pickering, the friend of Washington, the incorruptible Roman of the young republic; the comprehensive power of Parsons, the statesman and jurist; the sagacious merchants who at that time had explored unknown seas, and given the ports of Essex County a name throughout the world,—what an abounding treasure of greatness has accumulated for us of this later day! In letters and law and public service we point now to Prescott, and Hawthorne, and Whittier, and Story, and Cushing, and Rantoul, born and nurtured on our own soil. The part, too, which Essex County performed in the patriotic services of our first heroic period has not been forgotten by her sons of our day. The lesson taught by Pickering at North

Bridge, and by the men of Danvers who marched to the fore front for the freedom of their country, is fresh in our memory, and guides us still. When the Union was threatened and the flag was insulted the sons of Essex were among the first to enter Baltimore, the first to enter Richmond, and the last to leave. They fell on almost every battle-field of the war. They were found among the horrors of Port Hudson, at the weary work at Vicksburg, fighting for freedom at Gettysburg, toiling with Grant through the gloom of the Wilderness, holding New Orleans under loyal sway with Butler, passing along the great march with Sherman, manning the decks of our navy on every sea. What a half-century of greatness the Almighty Father has bestowed upon us! May we who are here never forget our obligations, and may those who come after us be true to their great inheritance.

In concluding this address, gentlemen, I desire to express my grateful recognition of the honor you have conferred upon me, by selecting me for a second time to discharge this duty—an honor bestowed by this society upon but one other, and he the distinguished first president. I congratulate you upon your career thus far; upon the wisdom and good judgment which have always guided your counsels; upon the fraternal regard which has always existed among your members; and upon the devotion of your present presiding officer, in whose hands the first half-century of the society is brought to a bright and prosperous termination. I trust your career will still be successful, and that among the most useful of the institutions which we transmit to those who come after us will be the Essex Agricultural Society, supported by the practical intelligence of the county, and surrounded by all the delightful associations which cheer alike the young and the old, in a cultivated and happy rural life.

EDUCATION IN AGRICULTURE.

An Address before the Middlesex South Agricultural Society.

BY THOMAS HILL.

The art of the farmer is in many respects among the highest and most difficult of human attainment. It shares with medicine, education and government the peculiar honor of dealing with organic nature, and even with moral nature, as its material. The mechanic arts of every description are conversant only with the mechanical or material properties of things, and when they employ vegetable or animal products they deal with them simply as mechanical or chemical agents; so that these arts require for their explanation and development only a knowledge of the lower branches of the hierarchy of sciences. Not so with the art of healing, in which it is essential for the physician to understand the human frame in its physiological as well as anatomical functions. Not so with education and government, which seem to have only the most remote connection with these lower subjects. And not so with agriculture; for the farmer, although requiring machines with which to till the soil and harvest the crop, and obliged to conform to the chemical laws in his manures, is principally concerned to understand the relation of the living plant and animal to the conditions under which they are placed; and this leads him into the spheres in which physiological, and, in respect to animals, even psychological knowledge, is needed. That knowledge may or may not be scientifically and methodically arranged in the farmer's mind; but the successful farmer must have, in some form, a working knowledge of the highest physical sciences and of the rudiments of the psychological.

The relation of the practical arts to the sciences is close and vital, but is often misapprehended. As in all other matters, the errors lie in two opposite directions. Some men exaggerate the benefit which the practical arts receive from science, others undervalue that benefit.

In endeavoring to form a just estimate and a sound opinion, let us begin by recollecting that science and the arts are independent, and seek different ends. The arts serve the body, or if serving the mind serve it through the senses, and the presentation to sense is the end of the art as such. But science serves only the mind, and seeks a presentation to sense only as a means of conveying truth to the understanding. Truth is sought by science simply for truth's sake, or if sought as an instrument it is sought only as an instrument for discovering truth. It is, therefore, an irrelevant question to ask the use of any particular branch of science, if by use is meant anything else than being a key to higher truth. Certain propositions, in geometry for example, may be called more useful than others, because they lead to, or are subsidiary to, more of the higher theorems than other propositions. The Pythagorean proposition, for instance, is to be considered a useful proposition in the scientific or mathematical sense, not because the carpenter squares the frame of his building by it, or the draughtsman tests the accuracy of his square, but because this proposition, that the sum of the squares on the legs of a right triangle is equivalent to the square on the hypothenuse, is a basis on which rests the demonstration of numerous theorems in trigonometry, analytical geometry, the differential calculus, and other branches of abstract mathematics. A scientific labor is always justifiable when it brings out truth, and truth is always worth having and worth seeking for the satisfaction which its possession gives to the human intellect. In the mere scientific instinct which leads particular men to the investigation of particular questions is a sufficient reason for the investigation ; and in the simple satisfaction of an intelligent curiosity to know the truth is a good, a benefit, a use, which compensates the scientific man for his labor, and his sharing it with others entitles him to receive in return the product of other men's labors.

To a devout man there is also in scientific discoveries, however devoid of use in the arts of life, always a great value, because he looks upon them as a reading of the Elder Scripture writ by God's own hand. No matter how trivial to vulgar eyes the pursuits of a scientific investigator may be, the believer in God must regard them as an attempt to interpret a part of that revelation of himself and of his own eternal attributes which the Infinite Creator has made in establishing this goodly frame of the visible universe. And since communion with Him and participation in his divine joys is the highest conceivable good, no pursuit of scientific truth is useless in this the highest religious aspect.

The arts of life, on the other hand, seek usefulness for material ends. Printing, for example, and writing do not seek truth nor the diffusion of knowledge; their ends, as arts, are accomplished when they have presented us a legible and handsome page, and the printer is unconcerned, as a printer, whether that page contain truth or falsehood. The mechanic, of whatever grade, is seeking an entirely different end from that sought by the man of science, and neither should expect or demand continued assistance from the other. The artisan, or mechanic, or agriculturist is seeking to serve the body—preparing something whose end is, so far as his art is concerned, merely material and temporary. The man of science is seeking only the gratification of the intellect; discovering immutable and eternal truths, the ideas of God: which, even when embodied and revealed through the fleeting rainbow or the fading flower, are themselves everlasting.

Yet both classes of men are working over the same materials, and in the same great laboratory of nature. It follows of necessity that they must each be able to give the other occasional assistance of the very highest importance. The school of life has other and higher lessons to learn than those of either arts or sciences. The social and religious affections are higher than the intellect; and the great lesson of charity is taught by making us all mutually dependent upon each other, and able to be helpers of each other in all things. The miner, the farmer, the mechanic or manufacturer, are not seeking directly to advance scientific knowledge; but they all do advance it indirectly, and are suggesting by their discoveries and inventions problems to the man of science which sometimes lead him to his most striking revelations of the laws of the universe. On the other hand, the scientific investigator, although seeking nothing for its uses, is continually discovering truths which have material utility. The conic sections offer the most marked example of great technological uses coming out of purely scientific researches. The school of Plato, long before the Christian era, investigated with great diligence these geometric curves as a pure matter of scientific curiosity, and were reproved by Socrates for wasting their time and their powers on such entirely useless subtilties. Nearly eighteen centuries passed away, and these curves were still of use only as an intellectual gymnastic for students curious in such matters. But when modern science and modern art began to make their rapid advances these conic sections became the foundation of navigation and surveying, and architecture and engineering; so that the purely speculative theorems of the leaders of science in Athens, having for almost two thousand years after their promulgation no practical utility whatever, have now become the most intensely practical and useful truths for all the civilized world. Many hundreds of instances, not of course so striking as this, but as exactly in point, might be brought forward to show that even when the discoveries of science do not immediately seem of practical utility, their utility may afterward be revealed by practical men; and that while science is, first of all and above all, to be sought for truth's own sake, it is secondarily also to be sought for the utilities which may be developed out of it. No man can calculate the pecuniary value, the commercial and business benefit to the world, of that geometrical fancy of Plato, the section of a cone by a plane, out of which so large a proportion of modern practical, applied mathematics has grown up.

In order that practical men may more rapidly avail themselves of the labors of scientific men, schools of applied science, that is of the more recondite arts, ought always to be placed in the close neighborhood of schools of pure science. Both the students and the teachers in these two departments of intellectual labor find a mutual benefit in a free interchange of thought. Neither understands what the other wants, and each will give the other aid only by accident; but it is by accidents that will continually happen, if the two sets of men are brought into continual intercourse. The technological student will suggest, most frequently without knowing it, valuable problems to the scientific inquirer, and the scientific inquirer will make, without knowing it, communications to the inventive spirit of the technologic student which will lead to improvements in the arts. The higher the character of the intellects thus brought into close relations the more rapid will be the progress, both in science and in practical inventions. As a mere means of advancing the material and pecuniary interests of the nation, it is therefore important to foster and stimulate the pursuit of scientific truth, not only to give the knowledge of science to men of practical turn of mind, but also to aid men of scientific ability to pursue investigations in the unexplored realms of nature.

We should remember that although steam and its wonderful applications to manufacturing, to ships and railway cars, have been the reward of practical men seeking directly utilitarian ends, yet, on the other hand, electricity and chemistry, with all their wonderful fruits, in the electroplating of ornamental ware and of the machinery of watches, in the electrotyping both of ordinary printed matter and of maps and other engraving, in the copperfacing of type, in the instantaneous transmission of intelligence and of commercial orders even to distant continents, in the improved arts of dyeing, including the discovery of the marvellous aniline dyes, in the manufacture of the metals magnesium and aluminum and their alloys, in the rapid conversion of iron to steel, in new modes of rendering wood indestructible except by fire, in photography in its myriad applications—all these and many similar gifts to the world have been the direct reward of scientific devotion to truth for truth's sake, and without expectation of the invaluable technological results of its discovery.

Moreover, these great gifts to the material prosperity of the world came in general from the investigations of men of the very highest scientific attainment, whose mere learning of what other men had done was very far beyond what can be acquired in any of our colleges or universities, and whose industry and zeal and genius carried them from that vantage point of the highest that was known far into the realms of what was unknown until they revealed it.

Men of such natural gifts are rare. The grand theological dogma of Maupertuis that the Divine Builder accomplishes his ends with the least expenditure of means—so fruitful of results in the mathematical investigation of physical laws—holds also in the moral world; and only a sufficient number of men are endowed with genius to secure the discovery of nature's secrets, in such order and with such rapidity as shall best subserve the grand plan of the education of the human race. But these men of rare genius accomplish their best work only when they have the best opportunities for learning and for culture. The trained muscle, bringing skill to direct its movement, is worth vastly more than any amount of mere strength can be. In order to have the horse valuable he must be broken to work, either in harness or under the saddle. In order that the inhabitants of a country should enjoy the blessings of modern civilization, and the nation be prosperous, the working-men of the country must have been trained to skilled labor in all the various arts of life, to make all the various articles of comfort and refinement and elegance, of usefulness in all directions, which can be needed in a cultivated community.

In this training of the peculiar gifts and powers of all the inhabitants it is, of course, essential to the prosperity of the State that the minds of those gifted with rare intellectual or inventive powers should be cultivated; and it is above all essential that the men of highest and rarest talent should receive the highest and most thorough culture. The character of the overseers in a factory, of a foreman in a shop or on a farm, is vastly more important than the character of the workmen; — better an army of stags led by a lion than an army of lions led by a stag. One man of genius, thoroughly educated, may double the value of the labor of ten thousand men applying his discoveries or adopting his improvements.

Now, the difficulty in our country is that these men of rarer gifts and industry and powers of endurance cannot find proper facilities for study, nor proper instruction in this country, if they wish to attain the highest culture and the highest results. Our schools and colleges provide for teaching their pupils some of the more prominent points in definitely acquired science, and some of the more prominent doctrines of speculative philosophy; but not one of them makes any adequate provision for students who wish to make extensive investigation, or to be guided in pushing their inquiries into the realms of the unknown. Our countrymen are too generally satisfied with themselves and with their labors. They have an extensive system of schools and colleges for the diffusion of knowledge, but almost no institutions which seek to advance and increase knowledge. There is no university as yet, in that sense of the word—an institution to stimulate and aid original investigation and research. The conception of a university, and of the income necessary to sustain one, has hardly yet entered into the minds of our people. Harvard College was fostered by the State for two centuries, but for the last half century has depended chiefly upon the aid of individuals. For a dozen years past its endowments have been increased at the rate of about one hundred thousand dollars per annum. But these donations have usually been given on condition that the income of them should be applied to certain specified objects, while for the real advancement of the university she ought to have several hundred thousands of *income*, and that untrammelled, so as to be applied according to the necessities of the hour.

What the farmers of New England need is an agricultural college in close proximity to and connection with a real university; the college having a full corps of men of ability among its instructors, and the university including among its professors chemists, botanists, zoölogists, and proficients in other physical sciences, of the highest genius and highest attainment. We ought not to be satisfied with less. That Christian magistrate and patriot, John Albion Andrew, whose memory is so fragrant that it is always a pleasure to mention his name, made an appeal, in his message of January, 1863, translated and quoted with approval in both France and Germany—an appeal for two millions of untrammelled additional endowment to Harvard, and for the purchase of the life-interest in the Bussey Farm, that by this endowment and purchase, and by the Congressional grant, we might have an agricultural college in connection with a university, and both worthy of the State and of the memory of the fathers. The legislature, undoubtedly for wise reasons, did not respond, and located the college founded by Congress near Amherst. But the farmers of New England should not suffer the good seed, sown more than five years ago by Governor Andrew, to perish.

What is needed is not an institution in which a hundred or five hundred farmers' sons may learn the mere art of farming, which they might have learned at home, or add to it a little mathematics and physics, which they might get at our high schools and academies, but an institution which shall positively advance the knowledge of farming, of draining and irrigating, of ploughing and cultivating, of planting and harvesting, of manuring and rotation, of breeding and raising, of feeding and managing, of field culture and forest culture, by leading a few young men to pursue physics and natural history to their highest attainable limits, with special reference to their application to agriculture. If twenty-five years ago Dr. Harris had been taken from the library of the college, and a salary given him that he might devote himself especially and exclusively to the study of insects injurious to the farmer, and of means to prevent their ravages, no man can calculate the benefit that might have resulted from the labors of that thoroughly learned entomologist in such a pursuit. Who can estimate the results that might flow from a thorough chemist giving his whole heart to the question of manures and rotation of crops; or from a man intimately acquainted with botany taking his whole time and strength for the investigation of the diseases of plants (such as the sycamore, the potato and the peach;) or a zoölogist giving his mind wholly to the breeding of oysters, or fish, or domesticated animals? Whole villages have been built in France upon the artificial propagation of oysters, and extensive fisheries established in other countries of Europe by the breeding of salmon. But our own oysters, superior to those of France, would better repay the propagator; our salmon, our shad, the smaller and more delicate species of smelt, and other fish, ought to be protected by legislation and multiplied by cultivation; the terrapin of Chesapeake Bay should receive more attention; many of our aquatic birds might prove as valuable as the turkey; the native apple of the West, the hickory nut, the pecan nut, the black walnut and butternut, the wild plum, the papaw, and other fruits, are as capable of improvement by cultivation as the grape and the cranberry. But it must not be expected that private individuals, like Mr. Bull, of our own county, should do all this work. The trial of such experiments would proceed faster and more satisfactorily under proper management of a well-endowed agricultural college. Consider also a moment the problems involved in the cultivation of our sea and inland marshes, the preservation of our timber, the improvement of the domesticated animals, the adaptation of manures and soils to crops, and you will see that there cannot be too great an amount of skill and learning brought to bear upon agriculture, and that we can scarcely estimate too highly the benefits that may arise from an institution which shall directly interest the most learned and talented men of the country in this pursuit.

We can attain these benefits for the farmers of New England and of the world only by strenuous and earnest effort. We must raise an endowment of three or four millions for Harvard University, or of five or six millions for Yale, or of seven or eight millions for Amherst. Cambridge is the most favorable place in which to found a high university and to connect with it an agricultural college of a high order. It will cost less in every way, because, by means of the present endowment of Harvard and of the Bussey Institution, the best beginning has already been made. Would that the farmers of New England and of the United States might perceive that agriculture is among the highest and most difficult of the useful arts; that it can be brought to its perfection only by calling in all the other useful arts and all the sciences as tributaries and aids; by giving to a few men devoted to its pursuit the highest possible training, such as can be obtained only in an agricultural college of the highest order, connected with a university of the highest order; and that this institution must, for the benefit of American agriculture, be situated in America, in our climate, upon our soil, dealing with American varieties of plants and animals, and cognizant of the needs of American society and American markets. Then we might hope that a generous zeal would be aroused in all classes of men to establish such an institution in our country; and if it could be shown that it could be established more speedily, more firmly, and with more prospect both of immediate and of future success, in some other way than by taking as a starting nucleus Harvard College, with its endowments, its buildings, its library, its Scientific and Mining Schools, its Herbarium and Botanic Garden, its Museum of Comparative Zoölogy, its incipient Bussey Institution, and its proximity to the scientific societies, museums and libraries of Boston, no pride of mine in my *Alma Mater* would lead me to say another word in favor of establishing a university and an agricultural college at Cambridge.

AMERICAN LABOR AND ITS POSITION.

From an Address before the Worcester North Agricultural Society, at Fitchburg.

BY DANIEL NEEDHAM.

We, as Americans, have nationalized labor. From the product of the centuries we have created a system differing widely from all previous systems of labor, and which seems to me with great significance can be denominated the American system,—original with us, finding neither its counterpart or resemblance in any system heretofore in operation either in the Mother Country or in the older nations of the East,—a system which has given a dignity and character to labor; which has not only robbed it of its ugly features so repellant in the history of the past, but given to it a charm and a power making it both desirable and attractive.

When the fathers landed and colonized Plymouth, and established on these far-off western shores a new home, they established also a new civilization. They broke off not only from the conventionalisms of European and Eastern governments, but from the established usages of organized society. In fact they became new men,—a new race of men,—differing widely in opinion, in habit of life, in thought, motive and action from all who had preceded them. They had new ideas of life—social and domestic life, as well as government. They saw in man a different being from what had been seen or recognized in the Old World. They saw man as God made him—above the fowls of the air, the fish of the seas, the beasts of the field and the products of the earth; for God had given him dominion over all these, and they endeavored to establish a government which would recognize their inalienable rights which had so long been denied to the majority of men. Therefore, while still on board the little vessel which had safely borne them from the fatherland, they entered into a solemn compact to recognize in their social and public life the manhood of man.

In the establishment of all European society this had been entirely overlooked, and not a nation on the footstool had ever recognized the manhood of man.

In founding the colony, then, from which we originated, and from whose laws our own have to a large extent been formed, the founders endeavored to put aside all prejudice of birth or fortune and elevate all men to the high plane of Christian manhood. In the history of the world, this was the first time that such a principle had been recognized as the cornerstone of national existence.

Recognizing this great principle, labor became not only dignified and respectable, but intelligent and skilful. Capital was made the handmaid of labor, and not its master. Capital grew out of labor, was its product, and therefore should not be its superior. Capital was assigned its legitimate sphere, and the laws of the new colony were made to protect the men of the colony; for when the men of the colony were protected the substance of the colonists was secure.

The idea, therefore, of educating labor and dignifying it and making it superior to capital was a novel idea—grew out of the necessities of the situation, and became nationalized as peculiarly American.

Growing out of this general education of the people, came inventions, lessening the labor of the hands, and contributing to the comfort and convenience and wealth of the world. So rapidly was invention succeeded by invention that it seemed as though the world had been standing still for centuries. In one hundred years of our American labor civilization had been forwarded more than during a thousand years preceding. It seemed a triumphal march, as the genius and skill of man were turning the crudest and most worthless productions of nature into sources of wealth and luxury.

The Puritans reasoned thus: "The more labor is dignified the more man is ennobled; the more labor is respected the more elevated the character of the labor and the more elevated the character of him who performs it." As a nation, we began at the beginning; we began with man. We said man had rights as man, and that before the law the rights of all men should be equal. We made the government for the man; to protect, not to distress him; to lessen his care and anxiety, not to increase it. And we made the rulers for the benefit of the ruled; not for their own aggrandizement, not to feed upon the people, not to look down upon them, but to look up to them and to serve them.

Thus America had in its national existence a new element—the element of manhood; and the rulers were elected for the people, and the laws were made for the people, and the wealth of the people was turned to the good account of all men in the nation.

And the good work thus inaugurated by the fathers has not been repudiated by the children. We still cling to the idea that the government was created for the people, and not the people for the government. Yet there is a tendency to follow in the ruts of the olden time. There is something fascinating about royalty and knighthood, and coats of arms and the power of wealth, which seeks to enthrall and enslave the weak and the feeble. And in America we find the conflict still going on between labor and capital, as though the fundamental law of the land and the lives of the fathers had not fully settled the question of priority of right.

In our Southern States the conflict has been very severe, and the question is not yet fully determined.

The men who founded Jamestown believed in money and family and blood. The men who established themselves at Plymouth believed in the man more than in money; in the man more than in his ancestry; in the man more than in his blood. And the conflict has been waxing warmer and warmer for more than seventy years, which of the descendants of the two races should be recognized as American. The conflict culminated in a resort to arms, in which the Puritan race was triumphant and man was recognized above the fortunes of birth or the influences of wealth. Thus the American government, in the breaking up of the institution of slavery and in recognizing the equality of men, nationalized labor and gave it the preference of capital. It said to the world, in a language of no doubtful interpretation, "A man is a man." No matter for birth, no matter for wealth, no matter for lands or titles, manhood is the criterion by which man shall be tested; and in the race for wealth, for honors, for emoluments, there shall be no drawbacks because fortune failed to smile on the infant brow that was kissed for the first time by the air of this Western World.

In America, for the first time in the history of the world, capital has failed to dictate the wages of labor. The laborer has, for the first time, been able to meet the capitalist on a common ground, and arrange his own terms and place his own estimate on the value of his services. This recognized right has given a dignity to labor, which has elevated the laborer by making common to him the right to knowledge and the uses of knowledge. Labor—American labor—has thus made subservient to its uses the school, the academy, the college and the university. It has commanded and received protection from the legislative, the executive and the judicial departments of the government. It has adorned not only these departments of the government, but all the professions and the industries which are developed by the cultivation and study of the most intricate of the arts and sciences. The lumberman of the Mississippi Valley and the honored Executive of the nation have found embodiment in the same person.

American labor, then, is educated labor; is free, independent labor; is cultivated labor. Thinks for itself; reasons for itself; makes its own terms and fixes the value for its production. It is well fed, well housed, well clothed; it is a necessity to the development of the moral, intellectual and physical man; it is a growth of civilization and Christianity.

Compare for a single moment the condition of an English laborer with that of an American laborer. Until very recently the rate of wages paid an English laborer was two dollars a week; it is now about two dollars and a half. Out of this the laborer must pay from one to two shillings for house rent, and live in a hovel at that; provide food, clothing and fuel for himself and his family; not allowed to keep even a pig or a fowl, for fear that he may steal food for them from his employer. He works twelve hours a day, and frequently sixteen and seventeen, and is never paid for extra hours of work except by some present or gift which is comparatively of trifling value. Says a paper recently read before the British Association for the Advancement of Science: "The women earn seven or eightpence a day for out-door work, and boys small sums in proportion. The men breakfast before they leave home on tea-kettle broth, which consists of an infusion of bread and water, with a little milk if they can get it. For luncheon and dinner which they can take with them, they have coarse bread and a little hard, dry skim-milk cheese. For supper, on their return home, they have potatoes and cabbage, with a small slice of bacon cooked with it to give it seasoning. Butcher's meat they seldom if ever see. They never lay by anything. They are not long lived, but often in their prime are feeble, and at the age of fifty are generally past labor—the result of poor living, sour cider, a damp climate, hard work and anxiety combined. There remains for them nothing but parish pay and the work-house." This is a statement made before one of the leading associations of Great Britain, and is endorsed by the association as in accordance with the facts. This is the condition of the English system of labor, which is far superior to many of the systems of nations on the Continent of Europe. To say nothing of the intellectual and social and moral condition of such men, how fearful is the physical! For these men, for their children and their children's children, there is little hope, except from the rays of light thrown across the trackless Atlantic by our American labor which is struggling still for complete emancipation from the tyrannical hands of aristocracy, monopoly and capital.

You need no statement from me of the condition of the American laborer to enable you to compare the one with the other. Our laborer, with equal rights with all other men,—at the ballot-box, in the school-room, in the halls of legislation, in the chair of state, in the learned professions, in the mechanic arts, everywhere,—he may rise or fall as his own energy, ambition, industry and prudence are developed. It is upon his own and not another's will that his success depends.

RELATION OF AGRICULTURE TO THE STATE.

From an Address before the Berkshire Society.

BY R. GOODMAN.

Our Puritan forefathers, at the time they threw off the spiritual yoke, and claimed the right of the unadulterated gospel, lopped off also from their landed system all such excrescences as were begot of feudal tenures, and made the ownership of land the privilege of all. They recognized in its fulness the truth that popular liberty cannot exist where there is no intelligent yeomanry or independent tillers and owners of the soil.

The accumulation of land under one ownership, whether of corporations, civil or ecclesiastical, or individuals, has in this country been always looked upon with jealousy, and whilst the absence of any laws encouraging entails or primogenital rights will always prevent a continued holding of large bodies of land in families, the existing legislation amply protects us from the grasping sway of corporate bodies. We may thus look to always have among us an independent class of agriculturists, owning and tilling their own soil, removed in a measure from the excitements of the great head centres, yet closely connected with every part of the Commonwealth by the iron veins of the rail and telegraph, that ramify from centre to circumference.

We have lived under a government so paternal that it is only when a great crisis calls for the energies of its sons to rouse in its defence, that we realize its sway over us; a government whose institutions are more popular and better adapted to the felicity of the human race than any that ever existed—a government that calls to our shores the poor and meritorious of every clime, and tenders to all, whether of foreign or domestic birth, a farm in the teeming soil of the West, almost without money and price. Religious and civil freedom go hand in hand;

no man, however low his position, wears upon his neck the collar of servitude. The barriers of society are thrown down, and no position, however high, is beyond the reach of the ambitious and deserving.

In the language of Halleck applied to Connecticut, we may say of our whole country, and especially of New England,

> " 'Tis a rough land of earth and stone and tree,
>   Where breathes no castled lord or cabined slave,
> Where thoughts and tongues and hands are bold and free
>   And friends will find a welcome, foes a grave;
> And where none kneel save when to Heaven they pray,
> None even then unless in their own way."

There is no one class of men that have greater interest in the maintenance of these beneficent institutions than the class which we represent to-day—the farming population. Politicians and soldiers may save the country, and in that hardly without our help, but agriculture *makes* the country.

The lamented Lincoln said to a gubernatorial aspirant for the Presidency who was chary about furnishing his quota of troops in the late rebellion, " If you want to be President you must help to preserve a country to be president of." And if we desire to perpetuate the blessings we enjoy down to the generations of our descendants, we must not only vote for the best men for our public servants, but exert ourselves in our calling to make it of worth in the state, to educate our children, improve our farms, repress the growing extravagances of the day, and become the preserving influence in the nation. As industrial toilers we are apt to forget that we are component parts of a great whole—that our labor, though primarily for our immediate support, is really one of the props sustaining the whole fabric of society. The term national prosperity is very commonly applied merely to the resources of government, and although these are derived from the common stock, it is difficult to convince the laboring man that he who apparently shares none of national wealth can be at all concerned in its amount. Every increase of product, however slight, and although apparently only beneficial to those who directly profit by it, is eventually advantageous to the whole nation. The whole wealth of the world has been acquired by labor. The conservative influence of agricultural labor as well as its importance as the groundwork of national prosperity, has been recognized by the best thinkers. Hallam, the acute historian of the middle ages, has justly observed, "that even in the least civilized people there were not wanting partial encouragements to cultivation, and the *ameliorating principle of human industry struggled against destructive revolutions and barbarous disorder.*"

This conservative principle is what, in the present stage of our history, we especially need, and which no class can supply but that attached to the pursuits of agriculture. As a nation, we are undoubtedly a *fast* people; we have been satirically described as running from morn to night, banner in hand, bawling "Excelsior!" We have been born, like Mercury, with wings on our heels, and like Minerva, with a metallic head-piece. The spirit of haste takes possession of all classes, except the agricultural, from infancy, and impels them to hurry along as if, like the wishes of Alexander, they had other worlds to conquer. We have no sooner netted the land with railroads, dotted the waters with ships, connected continents by wires under the ocean, fought out the most terrible internecine war known in history, than we hurry toward the north pole, annex any loose territory lying round, negotiate for all the disposable islands in the mid-ocean, and continue to hanker after the small "adjoining lots" of Mexico, Cuba and Canada! The same spirit of unrest infests the industrial class, especially those on the highways of commerce and manufactures, in their home and place of business. The merchant forsakes his house and hurries to his counting-room in haste to be rich, and is only enough acquainted with his family affairs to eat and drink and sleep under his own roof, and ascertain the number of his children by the annual bill from the family doctor. The manufacturer adds building to building, workmen to workmen, turns flesh and blood into mere adjuncts of steam, and has scarcely time to look from the windows of his factories and notice that the rest of the world is outside, and that with all his pains he cannot absorb the whole of it. Mothers have no time in our cities to rear large families. Young men turn away with disgust from patient toil; the young women, like the gay butterflies of the wise man, toil not neither do they spin, yet are clothed in gorgeous apparel. Education is forced, so that our youth obtain a smattering of many things, but a knowledge of little, and were it possible, there would be an abandon-ment of the old post coaches of learning for railroad speed on the highway of knowledge, and telegraphic communication with the inhabitants of the stars ; and even the celestial journey, instead of being slow and painful, yet sure, through a narrow way like that of Bunyan's pilgrim, would be like that of Hawthorne's, on a steam-carriage, with Beelzebub for a conductor !

Were these classes the only representatives of our people, we might well despair of the Republic. But happily, pervading all portions of the country, is a body of citizens, outnumbering all others combined, trained to simple habits of laborious and rural life, satisfied with what that affords them, measuring their prosperity not so much by its representatives, gold and silver, as by the produce of their labor and the simple luxuries and comforts of life, possessed of the inestimable blessings of health, home and family. Like the disciplined soldier of a regiment, the Old Guard of Napoleon, the Continentals of our revolutionary army, or the "regulars" of our recent formidable array, they are ready to breast the shock of temporary discomfiture caused by the haste, the recklessness, or the avarice of their ill-assorted and too eager fellow-soldiers, and restore the battle and save their country by the courage and persistence of their warfare.

It is the *fast* work that kills in beast or man, and we should remember, though our life is short, "art is long," according to the ancient saying, and that we are but building our portion of the edifice, and it is important that every part of the structure should be of equal strength. "Being," as Lord Bacon says, "without well being is a curse," and this "incessant and sabbathless" pursuit of pleasure and fortune by the masses in our crowded marts of commerce and manufactures, leaveth not the tribute which we owe to God or ourselves for our time.

There is neither time nor need to dilate upon the advantages of agricultural life. The wisest of mankind have attested to it as eminently calculated for human happiness and human virtue. "Give me neither poverty or riches" was the prayer of one of the sages of antiquity, and *generally the farmer has that prayer answered to him.* His independence is such that he could well emulate the reply of the Roman general to the ambassador of the king of Persia, who came to bribe him with great wealth, and found him washing the vegetables that were to constitute his dinner, with his own hands. "Tell your master that all the gold in Persia can never bribe the man who can live contentedly on turnips."

"The farmer," says Franklin, "has no need of popular favor; the success of his crops depends only on the blessings of God upon his honest industry."

But we are not to be content with possessing the comforts and necessaries of life. These are not the exclusive aims of existence. We desire to be useful,—we wish to do good,—we want to be esteemed. "I hold," says Lord Bacon, "every man a debtor to his profession; from the which, as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends, to be a help and ornament thereto." Are we not also debtors to our country, which in an unprecedented degree in the world's history, affords us opportunities of carrying out our aims and wishes without interference, and aids us by its bountiful soil, beneficent government, and its hospitable climate, in the pursuit of the substantial things of life? In what way can we as farmers best pay our tribute to our country and calling for these goodly gifts and privileges?

In the first place, we must remember that no one, no matter how high his position, can arrogantly say as did Louis XIV., "I am the state." We, the people, are the state, and each one of us is identified with its well-being, its welfare, and its progress. We must therefore give our country, next to our Creator, our best consideration, and in promoting the interests of our calling, ourselves and our families, never forget the motto blazoned upon our national escutcheon, "The one is made from the many." It requires the effort of all to preserve and maintain the integrity of the commonwealth.

Secondly. It must be self-evident to us all that a country without a people can be no nation. A Roman matron when inquired of as to her jewels, pointed to her children. Our matrons in fashionable life, if report speaks truth, may be more priceless than rubies, but it is by the wearing of other jewels than those. "Sparrowgrass" has sagely remarked that "children are a good thing to have in the country!" That seems to be the prevailing idea in our large cities and towns, where extravagance and selfishness absorb all the finer feelings of human nature, and the burdens and blessing of maternity are to be borne chiefly by those who have health and happiness in the country. Better that it should be so. The vast proportion of infantile deaths even among the healthy but hard-worked portion of the city population from those nurseries in the midst of the fetid air of those crowded marts, are not propitious to a prolonged or healthy existence.

About the middle of the last century, great excitement was caused in England and Europe by the publication of a treatise by Mr. Malthus, attempting to show that the population was increasing so fast that unless some check was resorted to, there would be a difficulty of procuring food. A scientific examination of the whole subject soon disproved the theory of the essayist, but in the interim many suggestions were offered on the subject of restraining marriages and reducing the increase of the people. Dean Swift even ventured to suggest that the most agreeable way to get rid of fat babies was to eat them! We need have no fears on the score of inability to support a population in our country. Without taking into consideration the constant and necessary checks upon population, by death caused by diseases, wars and the natural end of existence, the extravagance of fashionable life, the selfishness of men and women, we have ample room and verge enough to sustain the rest of the universe, if the land should be cultivated to its fullest capacity, and as but a portion of the Old World's inhabitants are likely to settle here just now, we can maintain those that do, and our own population, with even the present slighting style of culture. Let us not be afraid, then, to emulate our fathers in the possession of large families. Among them the average number of children to a family was from eight to ten. In our day it is reduced to three.

Children may increase the cares as they do the blessings of life, but a philosopher saith, " they mitigate the remembrance of death." " Happy is the man," saith the Psalmist, " that hath his quiver full of them!"

Next to having children, it is important to educate them. Education in what is called the best society is apt to consist more of the ornamental than the useful. Humboldt tells us that an Oronoco Indian, though quite regardless of bodily comfort, will yet labor for a fortnight to purchase pigment wherewith to make himself admired, and that the same woman who would not hesitate to leave her hut without a fragment of clothing on, would not dare to commit such a breach of decorum as to go out unpainted! Even so our semi-civilized votaries of fashion think more about the costliness of their dress than the fitness of it, and hesitate not to outrage all the decorums of society at the demand of the milliner. Girls without the least taste for music are compelled to labor at the piano with an assiduity and perseverance that, applied to the attainment of useful knowledge, would make them accomplished women, and boys waste time enough in elegant pursuits to make them learned and useful members of society. It was a custom among the Jews that all boys, of whatever degree, should learn a trade. Rabbi Judah saith, "He that teacheth not his son a trade, does the same as if he taught him to be a thief;" and Rabban Gamaliel saith, "He that hath a trade in hand, is like a vineyard that is fenced." In compliance with this good and useful custom of the Jews, our Saviour was put to the trade of a carpenter, and St. Paul to that of a tent-maker. The historian Gibbon relates that among the Christians brought before the Emperor Nero were the two grandsons of St. Jude the apostle, who was the brother of Jesus Christ, and when examined concerning their fortune and occupation they showed their hands, hardened with daily labor, and declared that they derived their whole subsistence from the cultivation of a farm in the village of Cocata, of the extent of about twenty-four English acres. The term education, as commonly understood, implies acquiring information from books and public teachers. But there are educations prior to that, consisting of the moral and physical discipline, of primary importance, and within the reach of all, however remote from the school-house, or restricted in finances. We do not believe in the dogma that "all children are born good," but we do not hesitate to say that to parental misconduct and neglect is traceable a great part of the perversity of children, and cannot doubt that if the parents exhibited more self-control, less irascibility, more justice and generosity, there would be less exhibition of evil passions in the children, and they would be better prepared to carry out in their future life the golden maxim of doing unto others as they wished others to do unto them.

The Persians did not, like their neighbors, wait to impose punishments upon those who broke the laws, but taking things higher, were careful from the beginning to provide that their citizens should not be such as were capable of meddling with any action that was base or vile. We, living remote from public haunts, have the best opportunity to bring up our families in habits of virtue and orderly industry. We can instil into the minds of our children the graces of simplicity, truth and honesty, and rare will be the instances in which these inculcations, if properly and early implanted, will be departed from. Upon these characteristics all other education may be engrafted; without them, the latter will be but the fringe without the garment.

Boys and girls want, above all, a good home education to start with. Labor in this hemisphere is honorable to all classes, and we have opportunities above all other classes of society of teaching our children the value of industry on the farm and in the house. A distinguished authoress (Mrs. Stowe,) has recently announced herself an advocate for the foreign system of having public bakers, cooks, &c., in our villages, that the labors of our households may be lightened. Far distant be the time of any such innovations in our old-fashioned homely habits. What the farm is as a school to the boy, the house is to the girl, and we have enough women already in cities and towns who, devoid of useful employment and of homes, find their time pass idly on their hands and are enabled only to devise appliances to get rid of the hard-earned money of their husbands on dress and gewgaws of fashion. The daughters imitate the examples of the mothers, and so expensive have the habits of those devotees of fashion become, that among fortune hunters the proposition is seriously maintained that the surest way to acquire a competency would be to marry one of these mantua-maker's blocks, and sell her clothes!

A witty woman, commenting on Mormonism, exclaimed: "How absurd! Four or five wives for one man; when the fact is, each woman in these times ought to have four or five husbands to support her decently!"

The great want in male and female education is *thoroughness*. We are taught too much book knowledge at once, and taught it too early in life. A boy who has been brought up on a farm during his tender years, with occasional attendance in winter at the common school, is much more likely to acquire rapidly and thoroughly subsequent knowledge, and attain eminence even in professional pursuits, than the one who has been hot-housed all his life in infant and boarding schools. The history of all our public men will furnish evidence of this fact. The strong mind needs the strong body for its support. The strain upon the physical in all pursuits in which the intellect is continually brought into activity, is immense, and it requires the continued infusion of fresh blood from the country to fill the vacancies in the pulpit, forum and legislative halls.

Let us see, then, that our boys and girls have a thorough training at home in morals, manners, labor, and the elements of book learning, and at the proper season give them all the facilities of a higher intellectual education. Don't be afraid of their knowing too much. It is too late in the day to present an argument in favor of farmers' sons becoming thoroughly educated. Public opinion has forced the establishment of institutions adapted especially to their wants. The State has ascertained that its relations towards agriculture demand that it should make provision for the continual growth of that class of men upon whose labor, patriotism and intelligence, it leans so heavily. The success of the agricultural college at Amherst is assured, and it is gratifying to know that the best students are the hardest workers in the field, thus showing that physical and intellectual labor are in no wise incompatible.

"The education which a man needs to enable him to act well his part in life is threefold: that of the head, the hand and the heart. With the head he knows, with the hands he does, and with the heart he is guided to will and to do what is right."

Upon these main branches may and should be engrafted the ornaments of life. Tastes should be cultivated. The ordinary isolation of the farmer's life should be broken into by the interchange of frequent friendly visits among neighbors, by the establishment of reading circles, farmers' clubs, at which the females should be frequent guests; and farmers' festivals, at which all should gather, and talk and laugh off the megrims of life, which, like cobwebs, will gather and remain until some fresh arrival brushes them away.

Almost as necessary as education of the mind is care and attention of the body. Exercise and diet have nearly as much to do with the mental condition as with the body. It has been affirmed that man partakes of the nature of the animal of which he eats, though it would be hard to call a man *sheepish* because he eats mutton, or *hoggish* because he eats pork! But it is almost an axiom that a gross feeder will have a gross mind, and it is doubted if true refinement of manners can exist in conjunction with an exclusive pork diet. As a people, we are too much addicted to pork and pastry, and farmers, who have an advantage over all others in obtaining fresh vegetables, milk, cream, butter and eggs, fowls and lambs, are yet criminally neglectful in providing a mixed and healthy diet for themselves and families. Until we reform in the matter of eating, we shall continue to have lank bodies, irritable dispositions, tendencies to disease, and instead of clear complexions and plump figures, our children will have leathery skins and angular frames. It is a great error to suppose a meat diet is necessary at every meal and at all seasons of the year. In all warm climates the rational nations abstain from animal food; irrational Saxons invert the wholesome principles of nature and soon die of liver complaints. In northern climates the habits tend almost exclusively to animal substances. In our temperate climate we should preserve a due medium, partaking more of animal food in winter, and greatly of vegetables and fruits in summer.

A popular writer has written a valuable essay under the heading, "Will the coming man drink wine?" It is to be hoped he will not, nor any other beverage that may enter his mouth to steal away his brains. But will the coming woman drink tea and coffee, or at least as much and as strong as she does now? At any rate she will not bring up her children on such exciting drinks, when she has abundant supplies of milk, and keep them lean and cadaverous, nervous and dyspeptic. The Chinese and Japanese, who drink as well as grow tea, partake of the fluid in its weakest state, and the coffee drinkers of the Old World dilute it with three-fourths of its bulk of milk. We consider it necessary to take the decoction in its greatest strength. Dr. Shaw, the naturalist, drank largely of green tea, until, having lost the use of one arm, he says he discontinued it and recovered the use of the limb.

Now, my friends, at the same time that we, as a class, are counteracting by simple integrity, straightforward sober industry in our calling, patient waiting for successes and calm content with moderate enjoyments of life, the fearful tendencies to demoralization, deterioration of manly and womanly character and disposition to run with almost every form of excess so prevalent in our large cities and towns; whilst we are preparing our children to offer them as citizens ready to participate in the support and maintenance of the institutions of the country with pure hearts, clear heads, and clean and healthy bodies, we should be derelict in our duties to that country, and ourselves and posterity, if we are not advancing in our business, making several blades of grass grow where one has grown before, and in all other respects increasing the means for supporting the population of the Commonwealth. Although I am a firm believer in the doctrine that to the man that hath godliness all other things will be added thereunto, yet I as firmly believe that those additions will be the result of his own exertions. It won't do to feel so righteous that, like the dervishes of the East, we are content to wrap our ragged robes about us and stand for life on a pillar of contentment. *Enterprise* is as essential to the calling of a farmer as to that of any other vocation.

Half a century ago, when the farmers of the country were also the manufacturers; when this society was composed by law only of those two classes; when the main premiums were given for cloths and woven goods made by the farmers' wives, and the only semblance of an invitation to horsemen to trot out their animals was the annual premium of five dollars to a mule; when the society was so comfortable in numbers and feeling that after the close of the fair all adjourned to an ample and hospitable dinner, at which the recipients of the premiums had the places of honor, and were pelted with eulogistic toasts, Elkanah Watson, the president of the society, in his address in the fall of 1813, during the war with Great Britain, (which, whether rightfully or wrongfully opposed by New England, in its results built up her manufacturing interests,) after alluding with natural admiration to the fact that the President of the United States and the United States frigate "President" were both clothed from the woollen and duck looms of Pittsfield, prophesied that Berkshire County was destined to become celebrated for its manufactures, particularly of woollens. You know how completely that prophecy has been fulfilled, and how since manufactures have become dissevered from agriculture they have shot clear ahead. And we look with pride and satisfaction upon the gentlemen now here, and who participate in the festivities of the institution which introduced them into the line of business they have so successfully carried out, and trust they will never be oblivious to the filial attention due to their foster parent.

Why have the manufacturers excelled so greatly in their calling, and agriculture hardly maintained its foothold, making but slight if any progress? "They have kept their eye," as the saying is, "upon their gun." They adapt their manufactured articles to the wants of the community. They are not content to run in one rut and trust to Providence for godsends, but sell high or sell low as the demand for their goods increases or abates; change from one style to another as public tastes fluctuate; and above all they observe closely, adapt their machinery to the reduction of manual labor as much as possible, and take advantage of every new improvement, any new suggestions which may tend to lessen the cost of their products and enable them successfully to compete with their fellow-laborers in the same department. If they need more looms or other machinery they are not content with duplicating the old pattern, but look about, and whether the article is native or foreign, if it is an improvement, if it will do the work better, if in the end, though the present price is greatly beyond the old one, it will reduce the cost of their fabrics, they introduce it. Every steam-engine, every new loom, every ship that is newly built, is an improvement upon its predecessors, because not only those employed in its construction as artificers, but those who will make use of it for profit, are on the alert to take every advantage of the constantly improving skill and knowledge of the day.

Here, my friends, is where the farmers fail. They are too content to walk in the footsteps of their fathers; too much afraid to experiment even with the new implements brought to their doors. They are hardly emancipated from the old superstitions that it is unnatural to grow large crops by artificial means; that the art of printing is an invention of the Devil, and all knowledge derived from books supernatural, and not to be employed in advancing their calling; that a lecturer on agriculture who is not a practical farmer is a "carpet-bagger," who should be reconstructed out of the county; and many are just beginning to realize that the grass cut by a mowing-machine is just as sweet as if cut by hand, and that the introduction of this and other machines has lessened their manual toil so that their brains can have free play and their wives and children more leisure for cultivation.

It is the want of education, intelligence, enterprise and observation, thus hardening to the old fossil habits, that prevents the farmer from making improvements upon his tools, or adapting his farm and its products to the wants of the community and his own progress. It took a President of the United States to invent the side-hill plough, and Jefferson was almost as proud of that as of the "Immortal Declaration." Gen. Washington, while compelled to be absent for years from his farm in the service of his country, directed its operation by weekly instructions to his manager. John Adams had a co-laborer in his almost unexampled wife, who by her brains ran the machine and supported herself and family from the farm, whilst her husband was holding up the pillars of his country; and Daniel Webster's (the farmer of Marshfield) instructions to John Taylor are too well known to be more than alluded to. Those instructions contain a mine of practical knowledge, which if followed would make all farming profitable.

It is by following the example of these great men and their successors, in bringing thoughts and brains to our avocation, that we can bring it up to the position it should maintain. I will not insult a Berkshire farmer by doubting that he takes and reads some newspaper devoted to his calling; that he attends his farmers' clubs, and listens to all suggestions as to the best mode of improving his practice; that he is theoretically acquainted with the advantages of cutting his grass early, and thus being able to fatten his stock without grain; of raising corn fodder to eke out his pastures, and avoid the necessity of feeding his meadows too closely or at all; of soiling his stock when his hay crop is likely to be short or his pastures not competent to carry his stock; of draining his land, and thus hastening the spring and lengthening the fall, and increasing his crops; of growing roots for winter dairying and promotion of the health of his animals; of the great economy in the use of the most approved implements adapted to his calling; of the importance of selecting good cattle for all purposes; of keeping them well housed from the wet and cold; of breeding to the best thoroughbred bulls within reach, and of discarding utterly the use of grades; and in fine, of the best methods of scientific farming. And now I want to see him imitate the manufacturers, and bring thought and observation to his aid, and reduce all these things to practice. He has the same advantages in the general. The same wars that have aided the manufacturer in getting rich have doubled the price of the farm products. The burdens of taxation are lighter on the agriculturist than on any other classes in the community. The whole scientific and mechanical world are continually proffering aid in furthering his progress, and it is his fault if he neglects to avail himself of it.

If by these means you double or increase your crops; if you can, with the same or extra labor and capital within your means, increase the productions of your farms and bring the necessaries of life within the reach of the non-producer dependent on them, it is *your duty*, as it would be your profit, so to do.

If you should apply to a lawyer to save or restore your property, to a physician to assist in regaining your health, you would consider him a bad citizen as well as a disgrace to his profession, if he did not aid you to the extent of his ability and for a fee proportioned to the service performed.

If at the breaking out of the late civil war, when our boys wanted the blue and we needed the boys in blue, our manufacturers had refused to make the kind of goods required, or demanded extortionate prices therefor, we should have looked upon them not only as unenterprising, but as unpatriotic and wanting in gratitude to the country and flag in and under which they live.

Upon the same principle, without regard merely to your individual profit, it is your duty to increase the resources of your farms, and ultimately those of the country. If by attention to cultivation and manuring, and the purchase of new kinds of seed, you can double your crop of potatoes, for instance, and thus bring them into market in greater quantities, of better quality and at reduced prices, you are bound as a citizen of the Commonwealth to do so. It is a criminal neglect of the farmers and gardeners about Pittsfield that they allow the people of the place to subsist so much on stale vegetables brought from a distance. A little enterprise, a little fellow-feeling, a true principle of morals applied to trade, would soon make your ground about here as rich and profitable as that near other large towns, and your pockets would not suffer from the change, whilst the whole population would be benefited.

It is as morally wrong and as unpatriotic for farmers to neglect to bring up their farms to their capabilities, to increase their productions, to avail themselves of all the devices of science, and to keep the prices of the necessaries of life as low as possible, as it is for traders to combine and monopolize any one or more articles in constant use by the bulk of mankind for a temporary profit. We have yet to learn to apply the great principle of morality to every condition of life. The old doctrine was to do unto others as they did to us. The new and better doctrine is to do unto men as we *want* them to do to us. This is the only doctrine of a citizen. It is peculiarly applicable to us as members of a free community. We are no serfs to any governor whatever. We, the people, are the rulers, and it becomes us to remember as well our bonds of citizenship as those of brotherhood and class interests. The atoms make up the mass. As the individual is so will the multitude be.

"What constitutes a state?
Not high-raised battlement and labored mound,
Thick wall or moated gate:
Not cities proud with spires and turrets crowned,
Not bays and broad-armed ports
Where laughing at the storm proud navies ride;
Not starred and spangled courts
Where low-bowed baseness wafts perfume to pride.
No! men, high-minded men,
Men who their duties know,
But know their rights; and knowing dare maintain,
Prevent the long-aimed blow
And crush the tyrant while they rend the chain.
These constitute a state
And sovereign law, that state's collected will,
O'er thrones and globes elate
Sits empress, crowning good, repressing ill."

FUTURE PROSPECTS OF AMERICAN AGRICULTURE.

From an Address before the Housatonic Agricultural Society.

BY GEO. B. LORING.

In considering the future prospects of American agriculture we cannot overlook the fact that wherever the American farmer goes he carries with him the right of freehold, the responsibilities of a citizen and the sole direction of his own fortunes. In this respect he is distinguished from all other people. And on account of this his labor as a farmer differs, and his opportunity differs, from the labor and opportunity of others. This may seem to be a mere idle speculation; but if you will imagine the difference between a hundred thousand square miles of Russian territory, inhabited and cultivated by serfs, and a hundred thousand square miles of American territory, inhabited and cultivated by American freemen, you can understand precisely what I mean. On the one hand, ignorance, hovels, rude implements of husbandry, tribute to a master, want of ambition, an ill-cultivated skill and ordinary crops; on the other, intelligence, neat cottages, school-houses and meeting-houses, greater and less degrees of thought, a desire to be a good citizen, an opportunity for good farming, good crops, and a share in all the effort and progress of the day commensurate with each person's ability and desire. On the one hand the scythe and mattock, and on the other the mowing-machine, the horse-hoe and the reaper and cleaner. On the one hand brute force, and on the other the most ingenious machinery.

It is not difficult to understand, therefore, that the agriculture which the American citizen carries with him must differ essentially from that which is developed by an order of society less free and less intelligent. Not that his productions will be greater, but that his system will be greater and his farming conducted with more regard to a strict economy of forces and less waste of labor.

It is difficult, moreover, for an American farmer to locate himself anywhere without carrying with him the peculiar American thirst for knowledge, and the feeling which we all have that new light is in store for us, whatever may be the subject of our investigation. This feeling may amount to a conviction, or it may simply rise to the force of an impulse or a dream. But its existence shows that the American mind may find room for a careful study of all practical details, and at the same time reach forward toward the most profound education. We really aim at intelligent farming—farming in which the natural faculties are guided by a careful education—farming which is something more than mere routine—farming which is based upon an understanding of the laws of nature, and which, when the exact amount of any crop is balanced, and the profit or loss accurately estimated, does not leave the cultivator there, but opens new questions for his investigation, and rouses his mind to the contemplation of all the wonderful processes of nature which are going on around him. If an agricultural college can be of service to any people, it can be to those only who are ambitious to carry the highest intelligence into their business, not solely because it is most profitable, but because its exercise is attended with higher virtues and with more social and civil and domestic peace and happiness.

I agree with a late governor of this Commonwealth, when he says: "My own idea of a college likely to be useful in the largest way to the people, most vigorous in its growth, promotive of the progress of thrifty and intelligent farming, productive of scientific and exact knowledge, (which is the true basis of prosperity,) worthy of Massachusetts, and able to command the respect while it challenges the pride of her agricultural community, is one perhaps not yet to be realized. * * * I should deeply regret to see an institution which bears the name of Massachusetts, and will be held to be representative of the Commonwealth, especially of the highest aspirations of her yeomanry, allowed, for want of generous support, to degenerate into a mere industrial school. There are a hundred farmers who can better teach technical farming, the manipulations of the industry and economy of the field, orchard, dairy or stable than they can ever be taught elsewhere than on the homestead of the intelligent, practical farmer. So, too, for the repetition of familiar knowledge, for the study of ordinary text-books, the cultivation of science in the way of imitation and of elementary teaching, we might safely rely on the academies and schools already provided. There is, however, a vision of an ideal excellence in the way of prosecuting the studies needed for the illumination of the dark places of our agricultural life which must some day be realized. Nature spreads out before mankind a world of almost infinite possibilities. The competitions of the mechanic arts have put in requisition all the aids of known science, are constantly stimulating into life new discoveries, or crowding the adventurous thinker or inventor to invade some new domain of knowledge or ingenuity; while civilized agriculture has, during the greater part of its history, contented itself only with the devastation of its fields and with seeking for virgin soils to be cropped in their turn to sterility. There is in our Commonwealth a very large and increasing body of intelligent farmers, who believe in a future for their favorite pursuit worthy of that art which is the fountain of all others and is the final source of wealth. But there is needed, as well for them as for those less impressed by the value of science, the inspiring lead of constantly advancing ideas. * * * I remember the photograph, the magnetic telegraph, the discovery of vaccination, the painless operations of surgery—the triumphs and miracles of genius. I seem to see for the earth herself and her cultivators the coming time, when husbandry, attended by all the ministries of science and art, shall illume and regenerate her countenance and recreate our life below."

You will pardon me if I occupy a few moments in considering this matter of agricultural education as one of the modern means of improving our art. I desire especially to urge attention to the practical education of all classes of young men in the business of farming, as the main object of our agricultural schools. Without this all our endowments will be in vain, and will be lost sight of as an instrument for improving the cultivation of the earth. And I am by no manner of means sure that the failure of forty years' effort to established schools of agriculture in this country is not attributable to the fact that the importance of practical education has been lost sight of before the more powerful temptations of scientific exploration and of captivating theories. Practical schools have been useful; none others have. And so strongly am I impressed by this fact, that I venture to quote the following extract from a report of a committee of the New York legislature, as early as 1822, upon this matter. In alluding to the advantages which are likely to grow out of the establishment of an agricultural school, they refer to the benefit which agriculture itself is to derive, and say:—

"This school will collect the best systems and most recent improvements in husbandry from Europe and America; adapt them to our climate, our soils, our productions, our wants; demonstrate their utility in practice, and disseminate a knowledge of them in every part of the State. The Hofwyl farm (at that time the celebrated school of M. de Fellenberg, in Switzerland,) will serve to illustrate the extent of these advantages. Mr. Brougham visited this in 1816 and inquired minutely into its details. Two years afterwards he spoke in high commendation of it in a report which he made to the British parliament on the subject of education. The whole establishment, he says, comprises but 214 acres; and the average annual profit of the pattern farm alone, for a period of four years, he found to be £836 sterling, or about $4,000, exclusive of the cattle concern, which was kept separate. We have numerous statements demonstrating the superiority of the new over the old system of husbandry, two or three of which shall be noticed in the abstract. The first comparison is made on a mixed, or grazing, breeding, and tillage farm of 314 acres, in York. Under the old system the net profits amounted to £318 10*s*., and under the new system the same yielded a net profit of £595, making a difference of £278, or 100 per cent. in favor of the new system of husbandry. The second one is that of a tillage farm of 139 acres in Lincolnshire. Under the old system the profits were £130, under the new £452; difference in favor of the latter £322, or 250 per cent. A third statement exhibits the profits of an acre of land, being a medium of several hundred acres in Yorkshire, for six years. Under the old system the profit was £1 9*s*. 3*d*., under the new £17 6*s*. 9*d*.; an increased gain of more than 1,100 per cent. in favor of the latter. The medium profit of an acre in tillage, in England, is stated at from $27 to $35 per annum.

"We need not resort to Europe for evidence of the disparity which exists between the old and the new systems of husbandry. Every day's observation affords proofs in our own practice. Why does the county of Dutchess outstrip her neighbors in fertility and wealth? Not because nature has been more bountiful to her soil, but because her farmers are better instructed. Why, in passing through our country in every direction, do we see one farm twice or thrice as productive as another, with equal natural advantages? This contrast cannot wholly be owing to indiligence or to indolence in the unsuccessful cultivator. It proceeds rather from a want of method—of knowledge. Knowledge is science, and science is only precepts and principles grounded on demonstration.

"It has been said that agriculture is a *trade*, an *art*, or a *science;* that as a trade it requires only the exercise of bodily powers; that as an art it employs the understanding and the judgment; and that as a science it comprehends a knowledge of natural history, of chemistry, &c., so far as these are subservient to the improvement of husbandry. We have many who follow the trade, less who practice the art, and but few who understand much of the science."

For the inculcation of all these an agriculural college requires a pattern farm, an experimental farm, and a system of education especially adapted to the business of agriculture. And I trust they who would convert our schools of agriculture into *belles lettres* colleges will bear this in mind, when they commence that service to which they have devoted themselves and which farmers demand of them.

Now, my friends, not serfdom, not bondage in any form, not tenantry, not the subjects of arbitrary power, can thus develop the art of arts and elevate society and beautify the earth, but the citizenship of an independent republic, in which the way is open, through virtue and knowledge, for every man to reach the highest distinction, and where prosperity shall attend upon industry and cultivation. This form of citizenship we possess—may we not now say as the special prerogative of our republic? That the form of intelligent labor of which I have spoken, with the social elevation which goes with it, is to overspread this continent, wherever the Federal authority extends, I cannot doubt. Thus far a large portion of our territory has been subjected to an exceedingly exhausting mode of tillage. Large tracts of our most fertile lands have become almost useless under that cultivation which is intended to draw the largest annual return from the soil, without restoring its fertility. In spite of this, however, our agricultural productions have been very large, and the increase has been very rapid.

The summary of the agriculture of the United States in 1840 shows that we produced at that time 84,823,272 bushels of wheat, 123,071,341 bushels of oats, 377,531,875 bushels of corn, 35,802,114 pounds of wool, and that the total value of the principal crops of that year was $336,000,000—considered at that time an enormous sum. In 1862, however, only twenty-two years later, the yield of twenty-one loyal States alone far exceeded this estimate. The wool clip had increased to nearly 80,000,000, and the value of the crops of that year are estimated to be worth $736,586,326—all this exclusive of the vast amounts of cotton, rice, sugar and tobacco which were raised in the Southern States, and which entered into the calculation of 1840. And if we examine the cotton crop of the same periods we shall find that it had increased from 790,479,275 in 1849, to 2,000,000,000, or thereabouts, in 1860, just previous to the breaking out of the war. Guided by these figures, what have we a right to estimate for twenty years to come? In the twenty-one States upon whose crops the computation of the crops of 1862 has been made, we may estimate the grain crops of 1880 to be worth $1,500,000,000, exclusive of the hay crop and the root, fruit and garden crops, constantly increasing. Of the cotton crop we will make no calculation; but we may say that if the loose and careless husbandry of slave labor produced 2,000,000,000 in 1860, it will be hard to compute the amount which free labor may produce on those same lands twenty years hence.

In addition to this actual increase in the products of our soil, as shown by figures, we must take into consideration the immense changes which have taken place in our country within the last twenty years. I have already spoken of the improvements which have been made in our machinery, all within that period. But more than all, the means of transportation have been vastly improved. Twenty-two years ago the great channels of trade in agricultural products were coastwise, or along our navigable streams. Of the vessels that were then daily taking their cargoes in the harbors of Charleston, New Orleans, Mobile and Savannah, it is safe to say that the principal portion of these freights was derived from the cotton, sugar, rice and tobacco, as well as other agricultural staples of the surrounding territory. The same was the case with the commerce of the Mississippi; and we find the numerous steamships and flatboats which plied upon that river in those days were laden with the agricultural products of the States that border its banks, or that are sent down through the interior by the Ohio. The commerce of the lakes was maintained, moreover, in a great measure by the transportation of the agricultural produce of the great States of Ohio, Illinois and Michigan, lying on their borders, to their Eastern markets. From the interior, the transportation to these great channels of water communication was slow, tedious and expensive. The grain crops of central Illinois and many parts of Ohio and Michigan were of necessity converted into beef and pork, and driven, as it were, to market, in order to avoid the cost of transportation by carriage, which almost destroyed their original value.

Now how changed! Every State, every county, every town, almost every farm, has its railroad communication. We have, as has been said, "rendered the railway a domestic institution, so that the steam-car visits nearly every hamlet and every considerable town. The music of its whistle no longer frightens the farmer's horse, nor does the proximity of the thundering locomotive, raging and sighing under its weighty burden, and with the pressure of its fiery spirit, disturb the equanimity of the anxious matron, careful for the safety of her child." Every hill pasture, the crops of every valley, are brought within a few hours of market. The cattle which to-day grazed upon the rich pastures of the West, before the set of to-morrow's sun are far on their way to feed the teeming population of New York and the Eastern cities. The transit of a thousand miles to-day is attended with less labor and annoyance than the farmer of half a century ago underwent in carrying his grain to market over fifty miles of rough and muddy road.

While these great changes have been going on in the improvement of agriculture, the development of its resources, and the establishment of all means for internal trade, the relations of the agriculture of the different sections of our country, one to another, have also changed. In 1840 more than two-thirds of the crop of Indian corn was raised in the slaveholding States, and but a very small portion of it was exported. The cotton-growing States at that time depended very much upon their own resources for feeding their people, supplying themselves with manufactured goods and luxuries from the North and from foreign countries. In the lapse of twenty years all this had changed. When the war broke out the cotton-growing States supplied themselves with meats and breadstuffs, hay, apples, potatoes, horses and mules from the West. From the Eastern States they purchased most of their manufactured goods, their bale-rope and bagging, their engines, sugar-mills and cotton-gins, much of their material for house-building, and mechanics to erect them, their paper, their books, their teachers, their shipping, their capital. In return the West and East consumed their cotton, sugar and rice. An immense domestic trade had sprung up, of such a character as to furnish a market for the special products of each section, whether drawn from the soil or created by the ingenuity of the people. Since the breaking out of the war this relation has changed, but not to such an extent that the return of peace will not re-establish the old order of things. I anticipate an increase of agricultural enterprise, now that the Federal government has secured its legitimate control on this continent, such as has seldom been witnessed—even greater than that which grew out of the war itself. There is no reason why our vast agricultural productions should not again enter into the commerce of the world, whenever the necessity for the present large supply at home shall cease and labor shall return to its accustomed channels. The application of energetic labor to the cotton plantations of the South, and the restoration of that great staple to the list of our productions, for home consumption and export, will constitute a branch of industry which will open immense wealth to our people. The West will once more feel the effect of that opening market upon her grain crops. The stimulus given to Eastern manufactures will furnish the New England farmer with local markets for all the products of his field, and orchard, and garden and dairy. And when that time shall arrive, my friends, you will find that the highest Northern civilization will have penetrated this whole land; that the light of New England schools will have been shed into its darkest places; that through the trials of war conflicting social institutions will have been harmonized; that the labor of this country will have been brought to the standard of free institutions; that the way will have been opened for the individual exercise of the best and highest human faculties, and that that American agriculture which has heretofore flourished in spite of sectional rivalries and jealousies will receive new strength from the energies of one people united in the common object of enriching and cultivating and civilizing this whole land, as a home for themselves and their children, and a refuge for the oppressed of all nations.

We of New England have a right to contemplate this opening prospect of American agriculture with peculiar gratification. We live in a section of the country where the most careful cultivation is especially necessary and important. The wholesale farming of the West and South does not apply to our hard climate and narrow valleys. There is no section in which the highest skill is so necessary, and none in which the farmer is so much stimulated to exercise all his best faculties. We have already done much, and we may do still more. And when we look around us and see that the minds of our people are directed once more to the land, we may anticipate a new era in which intelligence and capital will be devoted to the work of restoring the rural homes of our ancestors. In travelling through the New England States I am always struck with the increasing air of thrift manifested in the farm-houses and fields of our people; and I am always gratified by the drafts which the merchant and manufacturer are ready to make upon their incomes for the improvement of their farms. In what points, then, may we progress?

In horticulture and pomology we have laid the foundations well for great advancements. When we have learned what lands we can profitably devote to the growing of fruit, we shall find that the quality of that crop grown in New England cannot be surpassed in the United States; and I heard with pride, not long since, a statement from one of our most intelligent pomologists, that, in a recent journey in Europe, he found no pear-orchards equal to our own. While we avoid the wholesale fruit-growing of our ancestors, let us advance to a horticultural and profitable culture of the choicest fruits.

In the cultivation of field crops I have no doubt we shall make great progress. It seems hardly necessary that I should suggest to you any possibility of improvement in this respect. But we should remember that the carrot and onion and turnip and cabbage crops of but a few towns have become famous in the record of agriculture, and that the care and skill displayed in producing them are confined to a very small section of our little, busy, enterprising Commonwealth. The cultivation of the turnip is yet in its infancy among us—the easiest crop which the farmer can raise—the most useful, considering the amount of nourishment it affords to the acre. I have no doubt that the business of feeding cattle and sheep could be doubled in profit by devotion to this crop, and that the great mortality which often prevails among the latter would be entirely avoided. In the cultivation of corn and the small grains also there will undoubtedly be great improvement; and there should be. While Illinois raises 138,000,000 bushels of corn, and Indiana 92,000,000, and Iowa 49,000,000, and Michigan 15,000,000, and Maryland 14,000,000, and New Jersey 10,000,000, Massachusetts, with markets at every farmer's door, raises but 2,400,000 bushels. Considering the number of cattle which she feeds, and the amount of corn purchased for food by her people, this amount seems small, and should arrest the attention of the farmer.

In the construction of farm buildings we are already making great progress. I think the day is gone by when we must listen to arguments against barn-cellars, and when it will be deemed sufficient that a farmer should simply erect a two-story house for his family, without regard to its location or to the care with which the grounds about it should be ornamented with trees and shrubs.

With regard to our animals, we are undoubtedly on the road to improvement. The charm which has been woven about the old red stock of New England is gradually being broken. Farmers have learned that a good animal is the cheapest, and have turned their attention to the selection of cattle adapted to their various localities. We have learned that the most profitable cattle are those which make the largest return for the amount of food consumed. The old system of importing Shorthorns, regardless of the locality on which they are to be fed, has gone by. The attempt to introduce a breed of cattle among us, which only constitute an expensive luxury for the rich and an attraction chiefly because they are expensive, has failed among those who turn their attention to profitable agriculture. Since the easy transportation of cattle from the West has been secured, there has been less attention among us to the feeding of beef than formerly. And while, a quarter of a century since, a farmer was judged by the size of his cattle, the largest oxen being considered an index of the wisest owner, form and thrift and quality and fitness are now deemed of greater value, even when attended by reduction of size. The average weight of our cows has undoubtedly diminished; and I have no doubt that the profit derived from them has increased in corresponding ratio.

Every attempt to force an animal on land unfitted for it, every attempt to compel a large, heavy-carcassed cow to get a living on pastures adapted only to a smaller one, must end in failure. Our cattle should find abundant nourishment on our hills and in our stalls, and should be selected with reference to this rather than to that magnitude of proportion which gratifies only the ambition or the taste, regardless of the purse. It is well enough for the inexperienced, those who have no knowledge of agriculture, to linger at our exhibitions by the pens of cattle remarkable for size alone; but for the farmer of New England, who depends on the income from his pastures for a part of the summer profit of his farm, this will not do. It is well enough for the exquisite and artistic lovers of beauty to recommend a breed of cattle for the deer-like beauty of their heads, and for that alone; but the farmer who judges of cattle well, knows that delicacy and timidity of expression are not the characteristics most desirable; neither is he willing to excuse a whole carcass of defects and weaknesses for a pretty face. There are abundant indications of a growing disposition to select animals, here in this dairy region, especially adapted to its wants. And I cannot doubt that the time will come when New England will be as famous for its valuable dairy herds, bred with reference to her soil, as is an analogous section of the island of Great Britain. And when we have secured such a breed and have recommenced our dairy system, I trust our farmers' wives and daughters will find that they are strong enough to return to that old system of domestic dairying which added so much to the nicest cares of the household, brought large profits to the farm, benefited the health of our women, and gave us that priceless blessing in these degenerate days, good sweet butter. A clean, sweet, well-ordered dairy room is fully as pleasant and useful an appendage to a farm-house as a piano, a sewing-machine or a melodeon.

The remarks which I have made with regard to our cattle are also true with regard to our horses. It is conceded by the best judges that we have a New England horse, the growth of our hill-pastures and our sharp, clear climate, which is unsurpassed for his vigor, endurance and strength, and whose value is estimated not by his size and weight, but by his docility and power and by the economy with which he can keep himself in condition for work. It is found that New York and Pennsylvania can furnish the heavy draught horse for drags and teams and the slow, stylish carriage horse for the adornment of the luxurious equipage. But it is also found that the compact, strong, medium-sized horse of New England has a peculiar fitness for the farmer, and for that rapid driving on the road of which we are all so fond. We are looking back over the history of the New England horse, and we find that the introduction of the "Justin Morgan" is counted as the great step in the improvement of horses here, and that that little horse gave more profit to the farmer and more reputation to New England than has ever been derived from thoroughbred, or "Cleveland Bay," or "Percheron," or from the heavy, clumsy animals of Pennsylvania and the West. The best horses at the agricultural exhibition are small or medium-sized horses, bred in New England. I think the future prospects of horse-breeding in New England are flattering, if we may judge from the signs of the times.

The sheep husbandry of New England has reached a degree of excellence of which we have reason to be proud, and by which it is destined to become one of the most important and profitable branches of farming. For many years the West has been drawing its most valuable animals from the flocks of Vermont. It has been discovered that the kind of sheep bred there combines more good qualities, for the general business of producing wool and mutton, than any other sheep known. The profit of Western flocks has been largely increased by the infusion of Merino blood from that State. And we may be sure that the animal now called the "Improved American Merino," the special product of New England, will ultimately enhance the profits of sheep husbandry in this country, as largely as did the diffusion of Spanish Merino blood develop the same industry in Europe, producing the Saxony, Siberian, French and other fine-woolled breeds, now so well known there. The American Merino has been brought to such a degree of development that we undoubtedly stand in the front rank as a combination of the most desirable points in a sheep. We cannot claim to be foremost in each one, but, in all combined, unequalled. The best of them have:

1. A square, low, solid form, with great depth and breadth, indicative of strong constitution and vigor.
2. Admirable capacity to take on fat at maturity.
3. A carcase of mutton rivalling the Southdown and the mountain breed of Scotland and Wales in delicacy and flavor.
4. An even, uniform coating of strong wool, of the best quality, covering the whole surface of the body, and so protected from the effects of snow and rain as to waste but little in the process of combing or carding.

We have a soil and climate peculiarly adapted to producing this sheep in the greatest perfection. And while we may not hope to raise wool as cheaply as it can be done in Texas, or mutton as profitably as it can be done in Ohio, we may still render our sheep husbandry more remunerative than theirs by devotion to the business of improving the Merino for those markets where the soil and climate are less favorable than our own—to the growth of a compact, hardy animal, with a thick-set, uniform, lively fleece of wool, valuable to the American farmer and indispensable to the American manufacturer.

INTELLECT IN FARMING.

From an Address before the Hoosac Valley Agricultural Society.

BY ALEXANDER HYDE.

While we are ready to concede to other occupations all the honor that is their due, we still maintain that farming lies at the foundation, and it is eminently proper that on this festival day of farmers we should endeavor to magnify the calling which Adam pursued, and in which the majority of Adam's posterity are and ever will be engaged. We know that it is customary on these occasions to say smooth things to the farmers, to call them the landlords, the sturdy yeomanry, the backbone of society. This may all be very true. I yield to none in respect for my chosen occupation, and to the staid, reliable character of the great majority of the tillers of the soil; but I see so many defects in my own management, such a wide margin for improvement, so much still to be learned in the theory and practice of agriculture, that I do not propose any flattering unction, but rather to point out some defects in our present system and make some suggestions for improvement. The New England farmer already holds a proud position among the agriculturists of the earth. Foreigners who come here to study our institutions and customs are struck with admiration of the comfortable homes, the intelligence, industry, enterprise and virtue of the yeomanry of the Eastern States. Lord Morpeth, when in this country a few years since, remarked that "the farmers were the true nobility of this country. They live like princes. Their houses, equipage, dress, manners and conversation indicate nobility." This was the conclusion to which he came after visiting some of the No. 1 class of farmers. Possibly after knowing some of the second and third rate he might have questioned the nobility of some of us; but there is no questioning the proposition, that nowhere on the face of the earth are the rural population so intelligent, so well housed, clad and fed, and so elevated in character, as in our blessed New England. Scotland is our only rival for home comforts, general intellectual culture, and high standard of morality among her farming community. Were I not a New England Yankee, I would like to be a Scotchman; but I am glad that I am a New Englander.

While we honestly concede this high relative position to the farmers of the Eastern States, we must at the same time express our equally honest conviction that there is still much room for improvement both in farm management and mental and moral culture. As we ride from Dan to Beersheba through New England (which interpreted into our vernacular means from Berkshire to Barnstable,) the commodious, well-painted houses, surrounded by tidy lawns and shade trees, the spacious barns and well-cultivated fields, the cattle grazing on our thousand hills, leave the general impression of thrift, intelligence and comfort; but interspersed with these comfortable homes and productive farms we still find many shabby-looking dwellings, with little evidence of taste in their surroundings, the barns and fences dilapidated, and the fields overgrown with alders and hard-hacks. What makes the difference? The houses are not to blame for their brown and rotten clapboards, neither are the barns responsible for their leaky roofs and fallen underpinning, nor the meadows and pastures for being covered with weeds and bushes. The houses, barns and farms do the best they can under the circumstances. They would much prefer to carry out the purposes for which they were intended—furnish comfort for the family, shelter for the crops and stock, and an abundance of forage. As is the farmer so is the farm. The man is the responsible agent, not the inert matter on which he treads. Let another owner, one of skill and enterprise, take possession of one of these water-soaked, hard-hacked farms, with its dilapidated, moss-grown buildings, and how soon a change comes over the face of things! The surplus water is drained off; the hard-hacks and other bushes are shaken as a terrier shakes a rat; manure, the life-blood of the land, is gathered from the score of resources which have lain around the farm neglected for a century; the plough runs a little deeper, bringing up fertility from depths too deep for the rut of the former proprietor to penetrate, though he had skimmed it over all his days; a little money and a little taste applied to the buildings and their surroundings give them an air of home comfort.

This is not a mere fancy sketch. A neighbor of ours, Patrick Hall, (he will excuse us for calling his name, for we do it in honor and as a stimulus for his brother Michael and cousin Jonathan to go and do likewise,) has furnished the original from which the sketch is drawn. Some eight or ten years since Patrick purchased for a song a tract of land, cold as water could make it, and covered so thickly with hard-hacks that no other vegetation was to be seen. This he has drained, subdued and enriched, and now it produces premium crops of potatoes, grass and grain. A substantial, neat white house crowns an eminence of the farm, and is surrounded by that most beautiful and healthful of our forest trees, the white pine. A row of pines also borders the side of the road and the northern limit of the plantation, furnishing a shelter from the cold north winds and rendering the air fragrant with balsamic odors. The barn has been enlarged from time to time to accommodate the increased products, and is now a spacious structure, furnished with a cellar and other modern improvements. The whole establishment has an air of thrift and taste which must attract the attention of the most casual passer-by. I have watched its growth with great pleasure, and no farm gives me greater satisfaction, unless I except my own, on which a man may be pardoned for looking with paternal partiality. If some citizen with an abundance of capital had made these improvements, there would be little occasion for extra credit; but Patrick had only a few hundred dollars to begin his farming with, which he had saved from his hard earnings in a quarry. The farm is the creation of his own skilful industry. What a man has done man may do.

This leads me to say that if we wish to see our farms improved, the waste places cultivated, the crops doubled and even quadrupled, and our rural homes made more comfortable and attractive, the farmer must be educated for his calling. It has been one grand mistake to suppose that if a boy was bright he must be sent to college and be trained for the pulpit, the bar, the platform or the hospital, while the dull lads are kept at work as soon as they are big enough to pick up stones and potatoes. If an axe is dull we sharpen it, but if a boy's wits are deficient he must make up in muscle what he lacks in brain. This is treating steel better than we do boys. Besides, this practice is based on the false supposition that muscle is the main thing in farming. If this were so, we might as well leave the management of our farms to the oxen, for they surpass us in muscular power. The truth is, no occupation calls for more varied and accurate knowledge than agriculture. Not one of the whole round of sciences comes amiss on the farm. Chemistry, botany, geology and zoölogy lie at the foundation of scientific and practical agriculture. We include the practical, for no man can practice the art of agriculture without some knowledge of its science, derived possibly from his own limited experience, observation and conversation; but still it is science, using the word in its broad sense. We are too far along in the nineteenth century to ridicule science in agriculture, or book-farming, as it has been called. We might as well ridicule the science of medicine, or law or mechanics. Why should not the physician practise the healing art without studying the science, or the mechanic build a cathedral without a knowledge of the principles of architecture, just as well as the farmer practise his art with no preparatory study? No reason can be given for scientific research in one occupation that cannot be given in the other. We have quacks in medicine, far too many of them; we have mechanics, who are mere tools, doing without much thought just as the master directs; and we have practical farmers who go through a certain routine of labor, much as their fathers did before them and much as they see their neighbors doing around them. Excellence cannot be attained in this way.

I must not be understood as condemning or undervaluing practice. I would not trust a physician who had all the theoretical knowledge to be gathered from the days of Hippocrates down to the present time, unless he had acquired some skill by practice. It is only when science and practice are combined that we may look for marked success, either in the professions, trades, manufactures or agriculture. Some one may confront me with examples of men who have had no thorough training in the school, but still have risen to eminence in their callings.

I cannot deny that there are such. I have read of many, and met some of them and studied their peculiarities. They are uniformly men of strong native intellect, which they have cultivated in the school of nature, that was established long before colleges and seminaries were thought of. That they are men of science no one will deny who tries to fathom the depths of their knowledge. Moses, the greatest lawyer and military commander the world has ever seen, had no such training as is furnished by Harvard and West Point; but whoever supposes that he did not pick up all the wisdom to be found in Egypt and in the land of Midian has not rightly read the record. We are expressly told he was learned in all the wisdom of the Egyptians. He had no book-learning, for books were unknown; but he doubtless in his boyhood studied the parchment and papyrus manuscripts, the works of man, of which there were wonderful displays in the land of his nativity, and the works of God, of which there are still more wonderful displays everywhere; and when driven to Midian he still manifested the same inquisitive power. When tending the flocks of Jethro, his father-in-law, he had ample opportunity to study the great volume of nature, in which is contained more wisdom than in all the parchments, scrolls and books man has ever written. His inquisitive disposition was manifested when "the angel of God appeared unto him in a flame of fire out of the midst of a bush, and behold the bush burned with fire and the bush was not consumed." Moses did not run away in fear, nor sink to the earth paralyzed with astonishment, but calmly said, "I will now turn aside and see this great sight why the bush is not burnt." Such research will make a man scientific without the aid of schools and books. If Moses had been a farmer he would doubtless have been a scientific one. I care not where the knowledge is acquired, whether in the laboratory of the chemist or in the greater laboratory of nature. The main thing for the farmer, and for every man indeed, is to learn to think, and not to perform his labor in a certain routine, as a horse goes round in a bark-mill. Man is not a machine. Our heads were made purposely to think, to mould and direct inert matter as circumstances may demand. When once the habit is acquired of thinking continuously on one subject till its bearings are well understood, knowledge must accumulate, and is stowed away as systematically as is freight in a ship. The difference between a wise man and a fool is, the one holds and directs his thoughts, the thoughts of the other float along at random, shifting from one thing to another with every varying scene.

No one has a better opportunity to study the great book of nature, and learn its various sciences, than the farmer. His business leads him to commune with nature daily. She reads him manifold lessons of wisdom, and if he will only give attention to her teachings he must become wise; but the trouble is to arouse and fix the attention. We fear too many farmers plod along after their oxen, digesting ideas as lazily and intermittingly as the cattle chew their cud. The solitary life of the husbandman, though offering many advantages for the cultivation of the natural sciences and the moral sense, is not favorable to quick and active thought. It wants the stimulus of the contact with other minds. If a man wishes to keep his mind polished and keen he must live in society. The factory-boy will give and parry a dozen jokes while the plough-boy is comprehending one. The only mode of compensating for this defect in rural life is to commune with other minds freely through the medium of newspapers and books. These may be had on the farm as well as in the village and city, and though they may not make the reader as polished and bright as does personal contact, still the farmer may in this way become a strong and vigorous thinker. Polish is often acquired at the expense of thought. Among the yeomanry we do not look for the polish of the city lawyer, but we do expect strength both of muscle and mind; and as the brawny, strong arm can only be acquired by exercise, so the strong intellect can only be attained by habits of action and patient thinking. As the sluggish thought in rural life is great, the effort to resist it must be all the greater. In spite of all the disadvantages of their isolated situation, we find many farmers close thinkers, not only on matters connected with their occupation, but on the knotty points of politics, metaphysics and theology. Such persons do not allow their thoughts to drift along like logs on a sluggish stream, now stopped by an overhanging bush, now running into a cove, and anon slowly turning in an eddy. Their minds are kept constantly tuned up to concert pitch. The selfdetermining power of the will holds their mental faculties to constant action towards some definite point.

I would not have the reading and thinking of the farmer confined to his particular avocation. To be a man is more than to be a husbandman, and our aim should be to develop true manhood. Our first business should be to understand the theory and practice of agriculture; but we must remember that there are other duties devolving upon us besides ploughing and sowing, raising grain and getting gain. We are citizens of a great country, in which the power is in the hands of the people, and it is absolutely essential for the perpetuation of the republic that we should understand the theory of government and vote intelligently. To become a voter it is necessary that we should have some other qualification than that of being twenty-one years of age. The constitutional privilege that we have of voting when we become of this age is open to the same sarcasm which Philip of Macedon uttered against the Athenians when he heard that they had elected a hundred generals to oppose him on the battle-field. "Electing a man to be a general does not make him one. They might as well have voted that a jackass is a hero." Voting is a cheap privilege in this country, and we who enjoy the right should see to it that we use the privilege as not abusing it.

Besides the duties we owe to our fellow-citizens and our government, we hold relations to a higher Sovereign, the King of kings, the first great cause of all things; and the character of this Sovereign, the nature of His government, and the duties we owe Him, should be our chief study. Pope says "the proper study of mankind is man." He made a great mistake. The proper, highest and most ennobling study of mankind is God. Man is but the creature, God is the Creator. In comparison with theology, the science of God, agriculture is but the dust of the balance. Our minds can be expanded by nothing so much as in the contemplation of the Infinite.

To become accurate thinkers, it is not enough that we should be readers. We must learn to impart knowledge as well as receive it. All the rivers run into the sea, and why does not the sea overflow? Simply because it gives back to the land, in the form of rain, all that it receives in the form of water. Were it otherwise, the land would be exhausted, and the ocean would become one vast stagnant reservoir. God has wisely ordered that there should be a constant circulation of water. Like money, it is only good for something when current. So it is with thought. It should be kept in constant circulation. Farmers, as a class, are accused of being taciturn, slow of speech, and still slower at writing. It is true that they do not make so much noise in the world as politicians, and we are inclined to think it is true also that they do not accustom themselves to public speaking and writing for the press as they should. There is no reason in the world why the farmer should not address his fellow-citizens as well as the lawyer or the clergyman. He has ideas, and expresses them to his family and neighbors; why should he not express them to a number of families assembled together? The only possible reason is the want of practice. He has not that discipline acquired by exercise that will enable him to think consecutively as he stands up before an audience. Nowhere do our thoughts run so rapidly as when we stand on the platform to address a body of men without any manuscript for a guide. In our first attempt it is like driving a pair of colts without bits and reins. We hardly know whether we are in the body or out, on the earth or in the air. Phaeton, guiding the horses of the sun, could not have been more bewildered. With a little practice all this passes away. And here let me recommend the farmers' club as the best place in which public speaking can be practised, and the habit acquired of communicating to others what we know. The subjects discussed there are those in which all farmers are or should be at home. There need be little formality. The speaker is among his friends and neighbors, who have assembled to compare notes, and are desirous of receiving all possible information—not of criticizing the mode in which it is imparted. If a man can tell us how to raise two bushels of corn where we now raise one, we care not whether he speaks good or bad English. He may talk quick if he pleases, if he only communicates the idea. We have great faith in farmers' clubs, not only as a means of acquiring knowledge, but also as a school of practice for imparting it. If you will pardon an illusion to my individual experience, I will say that I have been a member of such a club for the past ten years, and have made it a matter of conscience to be present at its meetings. Our practice has been to designate beforehand some subject for discussion, and appoint some one or more persons who are expected specially to prepare themselves to enlighten us on the designated topic, and afterwards all the members present are called upon to contribute their quota of information. In speaking we seldom rise from our chairs, and feel the same freedom that we do by our family fireside. The result has been increased knowledge; and with the increased knowledge came increased crops, improved stock and greater thrift. Our club has numbered about twenty, and if two heads are wiser than one, much more must the assembled wisdom of twenty men be greater than that of the individual. The practice of this public speaking makes us more accurate observers and thinkers, and this comparing of experience takes the kinks out of those wise merely in their own conceit. The farmer's club does not cover so much ground as the agricultural society, but it cultivates the ground it does cover more thoroughly, inasmuch as it awakens more thought, and thought lies at the base of good farming. It may be added, in favor of this public speaking, that it is not like music, painting and poetry, in which mediocrity is laughed at and only excellence is praised. Any degree of skill in public speaking is desirable, and the art is just as attainable by farmers as by other folks. There is no power that man wields over his fellow-men like that of the orator; and if we are not fitted to instruct and guide a senate as was Daniel Webster, it is certainly desirable and possible that we should edify a club and "speak in meeting."

Analogous to public speaking, in its effects on the mind, is the art of communicating our thoughts by writing. In writing our ideas we are apt to be more accurate even than in speaking them, and this accuracy involves digestion and arrangement. It must be confessed that farmers, as a class, are deficient in this art. In handling the hoe and plough the fingers become a little rigid, and the use of the pen becomes a burden, and in some instances, we fear, is dropped altogether. This is neglecting one great means of mental discipline and public usefulness. Next to the power of a fluent tongue comes that of a nimble pen. The press is becoming more and more the fourth estate. I remember hearing in my youth the question debated, "Which has the more influence, the press or the pulpit?" It may be difficult to compare the two and decide this question; but the power of the press in this free country has rapidly increased, and is now immense. If farmers wish a share in this fourth estate they must write; I repeat it, they must write, or they will be left behind in the struggle for place and power. The reading of the community in these latter days is much concentrated on newspapers, and towards the newspapers the talent of the country greatly flows. These papers are open to communications from all, and thoughts expressed in them will reach thousands of minds and make lasting impressions. Agricultural papers are multiplying rapidly, and no farmer can afford to be without one, and should not be content without contributing his mite to the general stock of knowledge. He will find that giving knowledge, so far from impoverishing the giver, will enrich him rapidly. If he does not benefit his readers he will benefit himself.

It is a blessed thing that we live in an age when knowledge is increasing and many are running to and fro in search of it. The schoolmaster is abroad in the land, and after many years of trial and struggle we finally have schools established for the express purpose of training boys for the occupation of agriculture. We expect great things from these schools, and if the next generation does not furnish wiser and better farmers it will not be for the want of superior advantages. Agriculture, we hope, will be reduced to a more perfect science, and New England be cultivated like a garden. In our rugged climate and sterile soil is just the place for an agricultural college to flourish. On the fertile prairie little need is felt for the aid of science. As Cadmus sowed dragon-teeth on the plains of Greece, and forthwith armed men sprang out of the ground, so our Western farmers, if we may credit their story, have only to drop the kernels of corn in the furrows in the spring, and in the autumn their hogs rise up to do the harvesting, and in this lazy, slovenly way of farming the hogs become fat and the farm rich. I have not seen much of Western life, but what I have seen has convinced me there is truth in the story of the Western emigrant who said he went West to become rich, and his wife to become comfortable. He had grown rich, but as for the comfort he could not see it. As I was once passing through Wisconsin I met two old friends who had moved to the prairies for wealth and comfort, and one of them asked me if I had come out to settle, and the other quickly replied, with an emphasis which told more than the words, " Come from New England, where the sun shines all the year, to this country!" Their farms were large and productive, their stock abundant, but I must confess the sunshine of comfort did not surround their homes. In contrast with the prairie farmer, the New Englander has a hard row to hoe; but there is large compensation for his toil. The very obstacles he encounters call out his energies and make him strong and self-reliant. I glory in the rugged hills and beautiful valleys. And they are not so unproductive as some may think. We now raise more corn to the acre than Illinois. No State in the Union raises so much corn per acre as bleak, mountainous Vermont. This is the triumph of mind over matter. We wish to see still greater triumphs. Who shall put a limit to the productiveness of an acre of land? It used to be thought a thing incredible that an acre should produce one hundred bushels of corn. Now our figures run much higher than this. Eight hundred bushels of carrots, worth half as many dollars, seem a large product for one acre. We can easily raise one thousand. Who shall say to the live Yankee, with determining power of the will inherited from Miles Standish, and taught by Jonathan Edwards, "Thus far thou can go, but no farther." His answer would be, "I'll see if I can't." And when he wills to do a thing he does not wilt in the attempt.

I have endeavored thus briefly to inculcate the value of mind, especially to the New England farmer, in the cultivation of the soil, feeling confident that if the farmer is developed mentally the farm will show it, the stock will show it, home will show it. If any one feels stimulated to increased mental culture I shall feel rewarded for my labor.

FARMS.

ESSEX.

From the Report of the Committee.

The farm of Mr. Samuel A. Merrill, of Danvers, comprises fifteen acres of land, the soil of great variety and the surface very uneven—quite unlike that usually chosen for the purpose of market gardening. This inequality of surface gives better facilities for the arrangement of hot-beds, so as to secure suitable protection from the cold winds of early spring; and, it must be conceded, is better adapted to the production of some of the market crops, especially those intended for the *early* market. It precludes the necessity of underdrainage, which is an absolute necessity on some flat lands, where for the want thereof many crops failed entirely the last spring. This farm, before Mr. Merrill's occupation, was in the care of an administrator, who testifies that for a series of years no manure was applied; but sufficient crops were taken off to reduce the land to the lowest condition.

Mr. Merrill, according to his statement which accompanies this report, took the only course possible to restore it to fertility, viz., the application of large quantities of manure of various kinds, and the practice of thorough cultivation; and some of the Committee who from time to time have had opportunities to witness his operations will testify that these operations have been conducted with an energy and a determination to "push things" in this line worthy of imitation by all our farmers within our borders, or even in the famed county of Middlesex. The crops raised have generally been good, and the farm has shown an increased capacity from year to year.

In the specialty of hot-bed culture it appears that Mr. M. has been quite successful. As will be learned from his statement, a very long range has been laid down, and the arrangement and management seem to have been such as to secure satisfactory results.

The crops of Mr. Merrill are more varied than is usual among the cultivators of this vicinity, commencing with the earliest lettuce under glass in the spring, with other crops constantly maturing, and terminating with the late root crops in the autumn. One advantage of this system is, that if an unfavorable condition of the season affects *one* crop injuriously, *others* may compensate for the failure by uncommon excellence; or if some crops sell at a low rate in the market, others will bring such prices as to keep the scale even. This fact was particularly noticeable within a year or two, when it happened that the earliest vegetables under glass sold at very high prices, while those maturing late in the season barely paid the cost of cultivation.

During the visits of your Committee they saw many of the crops which are enumerated in the statement of Mr. Merrill on the ground, and they appeared to be abundant in quantity and of superior quality. Other crops which had been harvested and sold, some of which were seen by a portion of the members at an early visit, they have no reason to doubt are fairly represented by figures in the statement.

Many specimens of vegetables from the crops raised on this farm have been exhibited at our annual exhibitions, and sufficiently attest the success which has attended the labors of the proprietor, which success may, in our judgment, be attributed to the abundant application of good manure, the thorough working and pulverization of the soil, care and judgment in the selection of seeds, and the use of those only of known purity and excellence, the planting of the several varieties in such localities with regard to their habits and wants as will insure their best growth and most complete maturity, and such clean and careful cultivation and attention as only can secure the desirable results. When these requisites are united with the capacity to market the product in the best condition, regard being had to its proper maturity, and to the time when it can be disposed of for the highest price, whether (if a late crop) by putting it at once in the market, or reserving it a few weeks or months for a more favorable sale, the farmer cannot fail in ordinary seasons to receive a fair, though moderate compensation for his labor.

The buildings are of a very substantial character, the house being of brick and the barn of stone. The barn, though not constructed for the purposes for which it is used, and not convenient for an *ordinary* farm, is tolerably well adapted to the wants of this farm; and the other buildings, together with the extensive range of hot-beds, are well planned and situated.

Taking into view the fact that the land was worn out by neglect and constant robbery for a series of years, and that it has now become, by the judicious management of Mr. Merrill, one of the best and most productive market gardens in this vicinity, and as a recognition by the society of the value of such an example to the farmers of the county, we award to him a gratuity of twenty dollars.

For the Committee,

CHAS. P. PRESTON.

Statement of S. A. Merrill.

My farm is situated in the town of Danvers, near the iron foundry. It comprises about fifteen acres of land, with substantial brick dwelling-house, stone barn, and other out-buildings. I bought in 1864. At that time no part of the land was under cultivation, except a small garden. The rest had been lain down to grass several years before, and was nearly run out. I bought in the summer, ploughed first in the fall, and planted first in the following spring. I planted about fourteen acres, mostly with garden vegetables. In the fall of 1864 I laid down about eight hundred feet in length of hot-beds, five feet wide. In 1866 I planted the same land with about the same variety of vegetables as the year before. I also set out about one hundred pear-trees that year, and reclaimed a piece of land of about half an acre, which was so low as to yield nothing. I laid through it several blind drains. This land now bears grass at the rate of four tons per acre.

In 1867 I planted the whole land as before, treating it about the same in all respects. During these three years I dressed the land heavily, chiefly with a compost of meadow mud, fish, night-soil and barnyard manure. As I spent so much during this time for manure, I had to content myself without any other profit from my operations than the increased agricultural value of the land. I am satisfied, from its present productive capacity, that this profit was a very fair remuneration for the labor and capital invested. I commenced my farming in 1868 with about seventy-five cords of manure, planting about thirteen acres. In addition to this I used about thirty-five cords upon neighboring lands which I hired, about which nothing further need be said, as I propose to confine my statement to my own farm. I planted about three acres of onions upon the most elevated portion of the land, which is a gravelly loam with a clay bottom. The present year has been a bad one for onions everywhere. I had what may be called a middling crop. I planted one acre of cabbages, which yielded a good crop; two acres of sage, which succeeded well; one acre of beets; three-quarters of an acre of carrots; one acre of tomatoes; two acres of squashes and melons; the balance of the land having been devoted to various vegetables. As to most of the vegetables, they did not suffer from the weather, the crops being all I could reasonably expect. The partial failure of the onion crop was owing to unfavorable weather. There was no trouble from the maggot, and indeed there never has been on this farm that I am aware of. The potato crop was reduced about one-half by the rot. During the season I have kept four cows, five horses, and three or four hogs. But as I have carried on this farm in connection with other lands, and have kept no separate account of the labor, I cannot give any definite statement of the expenses.

The product for 1868 was as follows: —

Early vegetables, including tomatoes, lettuce, early cabbage, &c.; total amount of sales, . . .	$3,153 98
Sage, 2 tons, at $440 per ton, ...	880 00
Late squashes, 4 tons, ...	160 00
Onions, in addition to sales included in first item, 600 bushels, ...	1,200 00
Beets, 200 bushels, ...	90 00
Carrots, 10 tons, ...	150 00
Hay, 4 tons, ...	100 00
	$5,733 98

I do not understand it to be necessary to give any details of the expenses of carrying on the farm, as my object is not to make any exhibit of the mode or success of carrying on my business, but to show that I have improved the farm; that it is now in a good state of cultivation, and that it has the past season produced large crops. I can say, however, that I have the present year made farming pay as well as I could reasonably expect.

THE PESTS OF THE FARM.

NORFOLK.

ESSAY BY EDWARD A. SAMUELS.

An essay upon a subject comprehending so wide a field of investigation might fill volumes and still be far from exhausted; a very large proportion of the mammals, some of the birds and myriads of the insects are continually at work, through their whole lives, against the labors of the farmer. To describe even the species of these animals peculiar to our own State, the extent to which they are injurious, and the manner in which they do their injury would require a space beyond the necessary limits of the present sketch. But there are some species whose habits and characteristics have distinguished them as especially noxious, and I shall confine myself to a discussion of these. In the lives of those animals, usually regarded as pests, some share of their operations are beneficial, so that the amount of injury they inflict more than balances the good they render. Some of the mammals and birds are beneficial by destroying noxious insects; but their predatory habits and wholesale destruction of small beneficial mammals and birds more than neutralize the good they do. An animal, then, to be noxious, must, in plain language, do more harm than good; and to be beneficial, the reverse.

MAMMALS.

Among our mammals, the first group which attracts our attention is that which comprehends the rats and mice, called the *Muridæ*, and of these animals the common brown Norway rats and field mice are, economically speaking, the most important. The former of these is, undoubtedly, one of the greatest of all pests. The brown rat does not appear to be indigenous to this country, but was undoubtedly introduced from Europe in the ships of the early settlers. Its history seems to be imperfectly known, some naturalists believing that it came originally from the East Indies, others, from the West; many assert that it came from Norway, while others maintain that it was common in England before the Norwegians even heard of it. Other authorities state that this species came from Persia and the southern regions of Asia, and that the fact is rendered sufficiently evident from the testimony of Pallas and Cuvier. Pallas describes the migratory nature of these rats, and states that in the autumn of 1729 they arrived at Astrachan, in Russia, in such incredible numbers that nothing could be done to oppose them. They came from the western deserts, and even the waves of the Volga did not arrest their progress. Pennant states that this rat was first seen in England about 1728, and in Paris still later. Whatever the early history of this animal may be, it is a fact that the brown rat was not known in this country until it was settled by Europeans, and, even now, it is unknown in the West beyond the limits of civilization, upon which it seems to be an attendant, accompanying it in its marches, establishing itself with it, and living on it. The habits of the common rat are well known; he is courageous, sometimes even ferocious, cunning to a proverb, destructive, mischievous and filthy. His food is almost anything edible; in fact, he may be called truly omnivorous.

A writer uses the following language in describing the habits of this species:—

"Its food consists of almost every kind of animal and vegetable substances eaten by other animals. In granaries and corn-yards it is extremely destructive, committing its depredations at leisure in the heart of the stacks, where it frequently produces its young, and whence it cannot be expelled until they are taken down, when the quantity of corn destroyed is sometimes found to be enormous. In houses it feeds on bread, meats, vegetables, in short, almost everything edible that it can gain access to." The rat is also "very destructive to chickens, rabbits, young pigeons, ducks, and various other animals. Eggs are also a favorite article of food, and are sought with great eagerness."

Among the enemies of the rat, the weasel, skunk, fox, cat, hawks and owls are perhaps the most active; but almost every living creature regards it as its enemy, and if sufficiently powerful, attempts its destruction, and contrary to the canine maxim that "dog will not eat dog," the rat even preys on his fellows and destroys at every opportunity the young of his own species. In fact, with its innumerable enemies this animal would soon be exterminated were it not for its astonishing fecundity. Rodwell, in writing of this, says, in calculating the increase from one pair, that "the result is 651,050 rats in three years; it appears a thing almost incredible, yet it is an arithmetical fact." It is proper to observe that in this calculation he averages the litters at eight in each case,—a very fair average, as they have been known to have twenty-three at a birth, and less than eight is the exception instead of the rule. He allows half of each litter to be females, while, in fact, there are considerably more females than males in every litter. Therefore, taking these things into consideration, the result he arrives at is certainly not above the actual number that might spring from one pair in three years, were it not for its many enemies, which, of course, tend to keep its numbers diminished to a certain extent, although not, unfortunately, to the desirable limits.

Many plans have been devised for the destruction of this pest, the most successful of which have proved to be by poison. The following are some of the recipes which have been found efficacious, several of which I included in an article on our mammals, published in the United States Report on Agriculture for 1863, to which I would refer for further facts regarding this animal and others to be treated of in this paper. Mix two ounces of carbonate of barytes with one pound of suet or tallow, and place portions of the mixture within the holes and about the haunts of the rats. It is greedily eaten, produces great thirst, and death ensues after drinking. This is a very effectual poison, because it is both odorless and tasteless. To one ounce of finely powdered arsenic add one ounce of lard, mix into a paste with meal and place it as above. It will be found effective. Make a paste of one ounce of flour, one-half gill of water, one drachm of phosphorus; or, two ounces of lard, half a drachm of phosphorus, and one ounce of flour; or, one ounce of flour, two ounces of powdered cheese crumbs, and one-half a drachm of phosphorus; add to each of these mixtures a few drops of oil of rhodium and spread on thin pieces of bread, like butter.

Recently a new plan of destruction has been devised by Mr. Tegetmeier, the well-known writer on poultry. He describes, in a late number of the London *Field*, his plan of operations, as follows:—

"At the commencement of this season I had a number of very choice and valuable pigeons in a large loft situated over a coach-house and stable. The flooring was very old, and numerous rat-holes communicated with the space under the flooring and above the ceiling of the stabling below. Attracted by the corn, the rats came and took possession of this space. My choicest birds were eaten alive by these most carnivorous of the rodentia. I had tried poison, traps, &c., with only partial benefit, and I had serious thoughts of selling off my stock of Columbidæ. At last, after deep cogitation, I determined to try a chemical remedy, namely, chlorine, a gas so potent and destructive to animal life that I knew that, if I could apply it advantageously, it must necessarily prove effectual. Fortunately it is much heavier than atmospheric air, so that there was every probability of its flowing down the holes if it once entered into them. I therefore took a Florence oil flask, adapted a piece of glass tubing to its mouth by means of a perforated cork, and to the glass added a short length of India-rubber tubing. In the flask I put an ounce of manganese and an equal weight of common salt, poured on a wineglass of water, and then added gradually an equal quantity of strong oil of vitriol, (sulphuric acid.) The cork and tubes being adjusted, the apparatus was ready for action. A spirit-lamp applied to the flask liberated a stream of chlorine, a gas which, if breathed, except when diluted with many times its bulk of air, is absolutely irrespirable. All the rat's holes having been covered over, one after another was opened, the India-rubber tube introduced, and a stream of chlorine directed down each. The space between the floor and ceiling must have been filled with a mixture of chlorine and air that no animal could have breathed and lived. Since that time I have seen no rats. Old and young have alike disappeared.

Should a stray adventurer make his appearance, I shall repeat my inexpensive remedy, and am now congratulating myself on having, for the present at least, extirpated the enemy."

Included in the *muridæ*, and constituting a very large subfamily, are the *arvicolinæ*, the field-mice ; and in many localities their depredations have established them as serious pests. In the Massachusetts Agricultural Report for 1861 I gave a full account of their habits, and also in the United States Agricultural Report for 1863, to which I would refer for interesting facts concerning them. The field-mice are particularly injurious to plantations of young fruit-trees in winter, gnawing the bark off the stems at the height of the snow, leaving a wound which sometimes completely encircles the wood, which of course is fatal to the life of the tree. They are also destructive in the grain-fields and in granaries, and when introduced, in hay, from the field into the barn, are very mischievous, gnawing the fodder and cutting it into fragments, and impregnating the whole mow with their peculiar odor. There are several species of field-mice in this State, included in different genera, the most mischievous of which are the short-tailed field-mice, *arvicola*. These animals are easily recognized by their short, thick body; short tail, usually less than half the length of the body ; and short, strong limbs. All the species of this group burrow in the earth, or beneath the roots of a shrub or tussock of grass. They all feed upon grasses, bulbous roots, seeds and grain ; they do not hibernate, but are active through the winter, seeking their food through the deepest snows.

These short-tailed field-mice can hardly be seen without being recognized, their peculiar form and habits giving them characteristics not to be confounded with any other animals, except, perhaps, the shrew-moles, which have forms somewhat similar to those of the mice, but they have more diminutive eyes ; their ears are hidden in the adjacent fur, and their heads are thinner and more pointed. Care should be taken in destroying the mice not to include in the general slaughter these shrews, for they, with the moles, are eminently beneficial, their food consisting of insects and larvæ. If the teeth of both shrews and moles be examined they will prove that vegetable food could not form part of the animals' diet, for they are very small and fine, and the strong, sharp, chisel-shaped incisors which all the rodents or gnawing animals possess are wanting, their place being supplied by fine teeth, incapable of severing any but insect food. There are in our papers, frequently, articles in which appear long descriptions of the depredations of the moles, and full directions are given for their destruction. Now when it is taken in consideration that these animals are incapable of devouring vegetable food,—and even if they were not, they could not digest it,—these articles, to say the least, are unnecessary and mischievous.

Like the other mice, the *arvicolinæ* are very prolific, and their ravages would be much greater than they are now were their numbers not kept reduced by numerous enemies. As they are chiefly nocturnal in their habits, they are destroyed by the owls and nocturnal mammals—skunk, weasels, &c. Snakes also prey upon them, and the reptilian form is well adapted to following the mice in their burrows. Foxes also kill great numbers, and they are favorite food with domestic cats. But notwithstanding their many foes, they are so numerous in many localities that the damage they inflict is often quite serious, and they are regarded as unqualified pests.

There have been many traps devised for their destruction. The following, although I have described it before, is worthy of notice here ; it has been tested and proved efficacious, and my description has been copied into many of the agricultural papers of the country : Dig in the earth, at the beginning of cold weather, in localities where these mice abound, short trenches from two to four feet in width at the bottom, and considerably narrower at the top, and about four feet in depth, the ends inclined at the same angle as the sides. The walls of these trenches, after becoming frozen, are impassable to mice that have fallen in, as they will have in great numbers. In these trenches many hundreds may be killed in a single season. The poisons which I recommended above are also effective when scattered about their haunts. If the mice are in barns, a very good plan is to scatter, where they may have ready access to it, quantities of fresh-slacked lime. The mice, and, indeed, rats will pass over it but once, and will leave the neighborhood of it in preference to frequenting passages where it is present. This remedy of course can only be available under a roof. In the gardens and nurseries it is well to avoid all chance of having these pests in them, by removing, before the snow falls, all rubbish, such as brushwood, straw, weeds and other litter, for these but furnish comfortable homes for vermin of all descriptions. Have no piles of strawy manure about, and, above all, remove all piles of stones that may have accumulated. It is noticed that the depredations of mice in orchards are comparatively few and unimportant, when the surface of the ground is cleaned up, as described above, and the reverse when it is neglected.

Woodchucks in Massachusetts are now in too many localities one of the most mischievous of pests. The habits of the animal, its forays into the pea-patch, the clover field, where, in eating and making paths, it does in a short time as much damage as would a much larger animal, and its wholesale destruction of young beans and green corn, are well known.

The numbers of this species have increased to a surprising extent within a few years. This fact may be accounted for in two ways. First, the war collected from all the rural population the sportsmen and gunners; young men who once or twice a week, with gun in hand, passed many hours in the woods and fields. Of course, to these hunters many a careless woodchuck fell victims, and the destruction was nearly sufficient to keep the vermin in check. While the war was in progress the animals were nearly unmolested, and they increased very rapidly. This fact has been noticed in connection with many of our different species of game, and my attention has been called to it on several occasions.

Again, the numbers of dogs throughout the State, in consequence of the enforcement of the laws enacted for the encouragement of sheep husbandry, and the requirements of the law that owners of all dogs shall pay for each animal a certain license or fine, have decreased to a very noticeable extent, and neighborhoods which could have boasted of dozens of curs a few years since can now show but a very few. The reduction of the numbers of these natural enemies to the woodchuck has, as before remarked, had its effect, and of late years the animal has become a decided nuisance.

As the woodchuck does not lay up a store of food for the winter, it hibernates, or rather its hibernation is natural, not the effect of not saving a winter's food. The mouth of its burrow is closed at the approach of winter, and the animal becomes torpid. The burrow is formed with a chamber raised and with several passages leading to it, and usually is beneath a rock or a stone wall. In spring, and while the animal is active, it is caught in steel traps which are placed in the mouth of its burrow and covered with loose earth. Recourse is also had to poisoning; and stifling in the burrows has also been practised, although generally with poor success, unless all the exits and entrances are discovered and closed. The best mode of destroying the animal that we know of is to place a quantity of gunpowder, enclosed in a paper bag, in the burrow, attach a fuse or slow match to it, close the burrow with earth, which should be tamped hard, and ignite the fuse. The explosion is fatal to the woodchuck, and the whole family, often, is exterminated.

The skunk is also regarded in most localities as a nuisance and a pest. We have, we confess, been undecided as to whether the amount of evil it does more than balances the benefits that it renders, and have often advocated its protection. The amount of benefits received is not always appreciated or even recognized; the evil done one is always apparent. We know that the skunk destroys great numbers of field-mice, and is always active in pursuit of the insects which abound in our cultivated fields. But we also know that it devours without hesitation every young bird and egg that it can find; and, taking into account the amount of good each one of its victims might have done, we fear we must deny the animal the benefit of a doubt concerning its value. In succeeding pages, as the benefits which a single bird may render in one season appear, the destruction of it cannot but be deprecated, and an animal whose whole life is mostly devoted to the slaughter of such friends can be regarded only as an enemy.

However, the well-known peculiarity of the skunk will always render it an object of disgust and hatred to the community; and if volumes were written in its defence, and advancing its real or supposed good qualities, the popular prejudice would prevail and the destruction of the animal would, as it is now, be secured on every occasion. The skunk is generally nocturnal, rarely venturing abroad during the daytime, but remaining quiet in his burrow in a ledge of rocks or beneath a stone wall, or perhaps in the burrow of a woodchuck, the owner having fallen a victim to the skunk's appetite. At early evening he comes forth and begins his wanderings. If met by a man or a dog he faces the intruder and offers battle, usually with such success that he is unmolested; no man, unless armed with a gun, being hardy enough to attack the beast, provided as it is with one of the most powerful weapons in nature. The fluid which the skunk ejects, instead of being the urine of the animal, as many people suppose, is a secretion held in glands on the under side of the tail, near the body. When this liquid is thrown at an object the tail is of necessity laid flat on the back. The secretion is of a yellowish color, and is, as most people are aware, of the most intensely disgusting odor; it has the property of blistering the skin on which it strikes, and if reaching the eyes of animals it is liable to produce blindness. The skunk breeds but once in the year, bringing forth from three to seven young in April or May. The young animals live with the parents until they are able to provide for themselves, when they are generally driven from the burrow, although they sometimes pass the winter with them.

Trapping this animal is a work of no difficulty, the skunk having the utmost indifference for all snares and pitfalls. We have seen one walk deliberately into a trap, rather than go out of his way six inches, and the trouble is, not to find a trap, but to find the best one for the peculiarities of the animal. Steel-traps set at the mouth of the burrow or in the fields which the animals frequent are sometimes employed; they are baited, as should be all snares for the skunk, with dead mice, or birds or pieces of meat. The objection to steel-traps is that in them the animal is as offensive as ever, and must be killed before it can be removed.

A writer on the habits of the skunk says: —

"In summer these animals can be taken in great numbers by the following method: Find a place where they travel from their holes to a hen-coop or through a corn-field. Make a path for them by treading down the grass, and set up sticks along on each side to guide them more surely. Set traps at intervals, and strew pieces of meat or dead mice before and behind each trap. A whole family of skunks will walk down this path, the old ones heading the procession; and as one after another is caught those behind will climb over and pass on, till all are taken. I have caught in this way two old ones and eight young in a single evening. They seldom discharge when first caught. I have found a trap made by a sapling bent down to a figure four catch, and baited with a dead bird or a fowl's offal, successful; but the best of all, in my judgment, is a large box-trap set in the animal's path or before his burrow. This trap closes completely, and when the skunk is caught in it he remains quiet without discharging. The trap still closed, should then be immersed in water until the animal is drowned, when he should be removed and the trap set for further duty."

The squirrels have in many localities, in consequence of their great numbers and depredations, been regarded as pests, and we confess that in too many instances some of the species have well earned the title; but all should not be condemned because of the mischief done by the few, and full allowance should be made for the benefits which all the varieties render in some way. We have in New England several species, and their habits and characteristics are well marked. The largest of these species is the common gray squirrel, and it is very generally distributed throughout the Atlantic States; with its congeners, the fox squirrel and black squirrel, it is well known. Its food consists almost entirely of nuts; and it is to this fact that the multiplication of our forest trees is very largely indebted; for its habit of burying the different nuts as a provision against the necessities of winter, covering them to the depth of two inches or more, in the rich forest-mould, secures for them the most certain germination. This squirrel is a very liberal provider for its future wants; and all who are conversant with its habits know how busy it is in burying these nuts, from the time of their early ripening until the ground is covered with snow.

Now, these nuts are not placed in one deposit, or two, or half-a-dozen; for accident might destroy such *cachés;* or they might be placed by heavy falls of snow or thick formations of ice beyond the reach of the depositor, who would then be left without food through the most inclement season of the year. No; by an exercise of the highest instinct, if not actual reason, they are buried each by itself in every available spot in the woods, whether on the hillside, or beneath a fallen and rotten trunk of a tree, or on the edge of a swamp—anywhere, that it may be found when occasion calls for it. And all know how this little animal goes through the woods in the heavy snow, digging down to its buried treasure with almost unerring precision. We have said it is a liberal provider; and what is the proportion of the nuts it eats, of the whole number it deposits? Not one-fourth; and as it instinctively buries only those nuts that are perfectly sound, without insect stings or germs of rot, of course all that are left buried sprout and spring from the ground, miniatures of the parent tree. It is well known that only a very small proportion of those nuts that are left on the surface of the ground, exposed to the action of the elements, ever mature and sprout; they rot and shrivel, or become the food and burrowing-place of noxious insects; and it can be very readily seen that it is on the labors of the arboreal squirrels that an extension of the growth of our forest trees depends. It is not alone in the confines of the woods that the nuts are buried; but all along their borders, sometimes rods away from them, in the open fields and pastures, do these active animals make their deposits; and people who live in the prairie countries, in which are belts of oaks and chestnuts, often find the young of these trees growing at a considerable distance from the parent grove, and attribute their presence to the action of high winds that had blown the nuts to that distance.

In many sections the gray squirrel is destructive in the fields of Indian corn, especially when such fields are situated near its haunts; but, generally speaking, we have no hesitation in saying that it is far more valuable on the farm than noxious.

The little red squirrel is another of our small quadrupeds that is distributed almost entirely throughout our continent. Like the gray squirrel, it makes its home in the woods, and is in some localities very abundant. In the pine and hemlock forests of the North it is probably the most common of all the mammals, every little grove of these trees having one or more families. It feeds principally on various nuts and seeds, and in localities where the various pines abound, together with the oaks and chestnuts. It is especially valuable in securing a continuance of the latter, and even an introduction of them into the forests of the pines and hemlocks; for, preferring the dark shades of these evergreens for its home, it naturally eats its food in them; and all who have paid much attention to the different phenomena of nature have doubtless noticed that when a patch of pine woods is cut off, a growth of oak, hickory and chestnut almost invariably springs up; that is, if such trees are growing anywhere within the distance of half a mile from them. This new growth may almost always be attributed to the red squirrel, who had buried the nuts from which it grew, for its winter food. In sections where the various pines are growing, their seeds furnish the principal food of this squirrel; and I have often found, in my Northern wanderings, large piles of the cones and coverings of the seeds at some favorite feeding-place of this species.

It is not alone in planting nuts that this squirrel is valuable; for, as it is not afraid to approach the gardens and orchards of its human neighbors, the choice apples and pears and cherries which it sometimes seizes and carries off to its forest home, to be eaten in leisure there, often produce, from the seeds the little robber drops, a fine seedling that is occasionally fully worth propagating. I have often found, in our woods, trees that had been undoubtedly planted by these squirrels, which were bearing fruit as choice as that growing on trees in the carefully tended garden and orchard from which they originally came.

Unfortunately for it, the red squirrel has another taste that has brought it into disrepute. It is especially fond of young birds and eggs, and the number that it destroys through the season is not inconsiderable; this fact, together with its predatory excursions in the garden and nursery, have given it, in some sections, a prominent position as a nuisance, and its destruction is secured at every opportunity; but, in more retired localities, it is usually spared by the farmer, who regards it as a funny, jovial fellow, full of good nature and pleasant companionship.

The striped squirrel, or chipmunk, is probably the best known and least popular of all our squirrels, and in most localities is really a nuisance. It prefers an open to a wooded country, and usually takes up its home in or beneath a stone wall, or pile of rocks in a field or pasture. Early in the spring, as soon as the heat of the sun has penetrated to its subterranean home, it makes its appearance; and, as soon as the first corn is planted, it begins its depredations. It follows the rows of newly-sprouted seed, and digging with wonderful sagacity into each hill, finds the grains, and, cutting out and eating the germs, leaves the remainder on the earth to become food for crows or other birds.

Later, when the strawberries and other small fruits are ripened, it takes no small share of these delicacies ; and when the grains are fit for harvesting, the amount this little thief carries off is sometimes astonishing. In addition to these articles of diet, the chipmunk secures great quantities of nuts ; and lazy people often watch the little gatherer, and follow it to its home, where, digging into it with shovel and pick, the stores that had been laid up for future needs are discovered.

In the winter, unlike the other species, this squirrel partially hibernates, sleeping most of the time in its burrow until warm weather comes. It would be unbearably abundant in cultivated districts did it not have enemies in all the birds and beasts of prey and the various snakes. Its pretty form, active habits and confiding disposition insure its tolerance in some localities; but generally it is regarded as a nuisance, and is killed at every opportunity.

As a means of destroying the squirrels, the gun is proved the most efficacious; they are also poisoned with corn which has been soaked in strychnine, and may be readily caught in box-traps and pitfalls. Numbers fall victims to domestic cats, and were the latter not destructive to small birds their employment would be advisable. We know a person who owns fifteen or twenty cats which are permitted to run in the fields about the house ; not a squirrel, rat or mouse can be found on the premises ; neither, unfortunately, can any of the small birds, and the utility of these cats is therefore most questionable, to say the least.

Rabbits, in some localities, are very troublesome, and their visits to patches of young pea-vines and tender vegetables are numerous and unwelcome. I have known of instances of large areas of early pease being eaten down to the ground when they were situated in the neighborhood of swampy woods, the home of the rabbits, and nurserymen often complain of the ravages committed in plantations of young fruit trees, the rabbits eating the bark entirely off around each tree. Animals trapped so easily as these, however, should never be permitted to have the range of the garden and nursery, and negligence in killing them should be repaid by their devastations. The ordinary box-traps, baited with a sweet apple, are always successful with them, and if these are not available, the common spring-up snare will be found sufficient. There are several modes of making this last-mentioned snare; the best that I have ever tried is made as follows:—

In swamps or young woods where rabbits frequent, select a sapling which is straight and of a diameter of from an inch and a half to two inches at the ground; trim the small limbs and twigs off to a height of about eight feet and cut off the stem at that point; prepare a slip-noose on a strong cord thirty inches in length, and affix one end of the cord on the upper end of the sapling; eight inches from this end tie a thin piece of wood an inch in length and a quarter of an inch in thickness to the cord; this is called the button. Select a forked stick, cut it to the length of a foot and drive it into the ground beneath the upper end of the sapling when it is bent to the ground; observe care in having the sides of the fork point in the same direction with the bent sapling; pass the button through the fork, and, keeping the noose from passing through with it, adjust the button in a perpendicular position, the upper end resting against the side of the fork above, the lower end pressing against a piece of wood six inches in length, a quarter of an inch wide and an eighth of an inch thick, called the spindle, which is passed between the extreme lower end of the button and the fork. Open the noose and extend it before and around the spindle, and keep it raised from the ground to the height of an inch or more, by thrusting into the ground, within the noose, a circle of pieces of small sticks. The snare is now ready to set, which is simply done by affixing to the end of the spindle, within the noose, a small sweet apple or portion of a larger one. It will be seen that the animal, in order to touch the apple, must pass its head into the noose; the moment the bait is touched the spindle drops, the button of course flies out, the noose is drawn tightly around the rabbit's neck, and it is instantly strangled. A little] practice will enable one to set this snare in about the time it takes to write a description of it, and it excels anything that can be prepared for the capture of rabbits.

The other mammals not heretofore mentioned, found in New England, are either beneficial or neutral in value on the farm. The weasels, minks, &c., are open to the same praises and objections with the skunk; the bats are beneficial; the foxes, raccoons, bears and cats are both beneficial and injurious, probably leaning more to the latter quality; and the ruminantia, including the moose and deer, are now so far from being numerous, and their habits leading them to forests, that any damage inflicted by them must be very inconsiderable.

BIRDS.

We now pass to the very large and interesting class, the birds. If we should say that none of these are really pests, that all should be protected and encouraged on the farm, and thus dismiss them, we would perhaps, in this general average, do justice to both birds and man; but there are a few species whose lives have placed them prominently before us, and about whom there is already much controversy, which we cannot pass by without devoting to them a small portion of our attention.

Probably the most important of these is the robin, and certainly none has been the subject of more discussion. At the outset I am willing to acknowledge that to small fruit-growers, generally, the robin is a pest and a nuisance; that it spares neither grapes, cherries, berries, nor ripe pears, and that with these persons it is all that their anger and disappointment have painted it; but the interests of fruit-growers are small, comparatively, with those of farmers generally, and the whole life and labor of the robin should be considered before it is condemned. In an article on the economy of food of some of our birds, which appeared in the Report of the United States Department of Agriculture for 1867, I devoted considerable space to the robin, and from the facts which I brought forward I will glean the most important. From memoranda of the contents of the stomachs of these birds, taken in different localities and in different times, I found that through the months of January and February the robin is beneficial, (taking units to represent the relative qualities); 21 units, by destroying noxious insects; injurious $4\frac{1}{5}$ units, by devouring beneficial insects; and neutral $33\frac{4}{5}$ units, its food consisting, in this proportion, of seeds and berries. In March it is beneficial $12\frac{1}{2}$, injurious $1\frac{1}{2}$, and neutral 17 units, feeding, as before, on injurious and beneficial insects and larvæ, but principally on seeds of uncultivated trees and shrubs. Through April, May and June I find that for the reasons above mentioned it is beneficial 52 units, injurious 8 units, and neutral 31 units. In July it is less beneficial than injurious, the food indicating that it is beneficial 9, injurious 18, and neutral 4 units. Through the balance of the year the food exhibits the greatest variety; but the most liberal margin will allow the bird to be 48 units beneficial, 28 units injurious, and 76 units neutral. In a general summary of the above brief analysis, we find that the robin is beneficial on the farm 142 units, injurious 60 units, and neutral about 163 units. From this we cannot but see that to the farmer, at least, the robin is far from being a pest, and that it is worthy of protection.

Did my space permit, I could give many pages from the writings of various authors in support of this conclusion; but such would be unnecessary. It is true as many pages could be produced of complaints made by different fruit-growers against the bird, but they would advance no facts new to us. Against the statement that is so often made, that earth-worms constitute the principal portion of this bird's diet, when fruit is not accessible, the simple fact appears that these worms are during the greater part of the season so far below the surface of the earth, because of the dryness of the soil, that they could not be reached. I do not pretend to say that they are not often eaten in great numbers, but I have no hesitation in pronouncing a very large proportion of the worms which the bird is seen to capture to be cutworms and other noxious larvæ, which fact I have proved on a very great many occasions.

There are a number of our other birds which have come under the ban of ruralists, because of their real or supposed destructive habits. The most important of these have been treated of in the article mentioned above, to which I would again refer the reader.

INSECTS.

The extent to which this class is mischievous on the farm is very great. It has been estimated that, in one season in the New England States, the amount, in the various crops destroyed, would reach millions of dollars; and when we take into consideration the variety of ways in which many of our insects are injurious, the different trees and plants and fruits which they attack, sometimes destroy, the estimate is not unreasonable. In fact, every variety of vegetable growth has its insect enemies, sometimes is assailed by a number of species at once, and almost eternal vigilance is necessary for the successful cultivation of nearly all our crops. Fortunately the Creator has provided numerous assistants for man in the work of protection, and most of the birds, many of the mammals, as we have already found, and whole families of the insects, are continually at war against the noxious ones.

Did my limits permit I would designate a few of the most valuable carnivorous insects, and show how and to what extent they are beneficial, but with a brief general recommendation for the dragon flies, which are carnivorous, feeding almost entirely upon noxious insects; for the tiger beetles, (those active beetles which frequent sandy plains and roads, and when forced to take flight alight after passing a short distance and turn to face the intruder,) which destroy great numbers of small lepidoptera and larvæ; and for the ichneumon flies which lay their eggs in the bodies of lepidopterous and other larvæ, the grubs of which when hatched devour the caterpillar that incloses them; I will pass to the most prominent of our noxious insects.

Of the species which attack our various fruit-trees, none of late years have proved more destructive than the canker-worm. This worm is the larva of the canker-worm moth, the male only of which species is furnished with wings. The history of this insect is now pretty well known; but for the information of those who have had no opportunities of observing its habits, I will present the account given by Dr. Harris:—

"It was formerly supposed that the canker-worm moths came out of the ground only in the spring. It is now known that many of them rise in the autumn and in the early part of winter. In mild and open winters, I have seen them in every month from October to March. They begin to make their appearance after the first hard frosts in the autumn, usually towards the end of October, and they continue to come forth in greater or smaller numbers, according to the mildness or severity of the weather after the frosts have begun. Their general time of rising is in the spring, beginning about the middle of March, but sometimes before and sometimes after this time; and they continue to come forth for the space of about three weeks. It has been observed that there are more females than males among those that appear in the autumn and winter, and that the males are most abundant in the spring. The sluggish females instinctively make their way towards the nearest trees, and creep slowly up their trunks. In a few days afterwards they are followed by their winged and active males, which flutter about and accompany them in their ascent, during which the insects pair. Soon after this the females lay their eggs upon the branches of the trees, placing them on their ends, close together in rows, forming clusters of from sixty to one hundred eggs or more, which is the number usually laid by each female. The eggs are glued to each other and to the bark by a grayish varnish, which is impervious to water. The eggs are usually hatched between the first and the middle of May, or about the time that the red currant is in blossom, and the young leaves of the apple-tree begin to start from the bud and grow. The little canker-worms, upon making their escape from the eggs, gather upon the tender leaves, and, on the recurrence of cold and wet weather, creep for shelter into the bosom of the bud, or into the flowers, when the latter appear.

"It should be stated that, where these insects prevail, they are most abundant on apple and elm trees; but that cherry, plum and lime trees, and some other cvltivated and native trees, as well as many shrubs, often suffer severely from their voracity. The leaves first attacked will be found pierced with small holes; these become larger and more irregular when the canker-worms increase in size, and at last the latter eat nearly all the pulpy parts of the leaves, leaving little more than the midrib and veins. When fully grown and well fed the caterpillars measure nearly or quite one inch in length. They leave off eating when about four weeks old, and begin to quit the trees; some creep down by the trunk, but great numbers let themselves down by their threads from the branches, their instincts prompting them to get to the ground by the most direct and easiest course. After reaching the ground they immediately burrow in the earth to the depth of from two to six inches, unless prevented by weakness or the nature of the soil. In the ground they make little cavities or cells by turning round repeatedly and fastening the loose grains of earth about them with a few silken threads. Within twenty-four hours afterwards they are changed to chrysalids in their cells."

In the chrysalis form they remain until they appear above the surface of the earth as moths, when, ascending the trees they deposit their eggs and die, their progeny replacing them in their numbers and devastations. .Dr. Harris farther continues:—

" As the females are destitute of wings, they are not able to wander far from the trees upon which they have lived in the caterpillar state. Canker-worms are therefore naturally confined to a very limited space, from which they spread year after year. Accident, however, will often carry them far from their native haunts, and in this way, probably, they have extended to places remote from each other. Where they have become established, and have been neglected, their ravages are often very great. In the early part of the season the canker-worms do not attract much attention ; but it is in June, when they become extremely voracious, that the mischief they have done is rendered apparent, when we have before us the melancholy sight of the foliage of our fruit-trees and of our noble elms reduced to withered and lifeless shreds, and whole orchards looking as if they had been suddenly scorched with fire."

As the eggs are deposited on the trees only after the female has ascended, the manifest remedy and protection is to prevent the female from crawling up the trunk. For this purpose almost numberless things have been invented, some of which have been in a measure successful, none more so than the strip of tar painted on the trunk of the tree while the females are active.

There have been various methods tried of applying this tar, the most efficacious of which being simply to tack around the tree a strip of thick brown paper about fifteen inches in width, and over this to paint a thick coating of a mixture of tar and grease two or three times in twenty-four hours, or at least once during the day and once in the evening, during which latter time the females swarm up the trees in the greatest numbers. It is essential that the tar be applied in a liquid form and sufficient grease should be mixed with it to give it the requisite thinness. The female moths on endeavoring to pass over the tar are arrested, and hundreds, sometimes thousands, are caught on one tree in a single night. I am acquainted with a gentleman, owner of a large orchard in Middlesex County, who keeps one or two men employed through every night during the season of the ascent of the female moths, in applying the tar, and he assures me that if he were not careful thus to keep them in check during the night that they would completely overrun his trees.

After the moths have obtained access to the trees and laid their eggs, there is very great difficulty in checking their ravages. Mr. Marshall S. Rice, of Newton, gives his experience and method of overcoming these pests, as follows: —

"Before the foliage was much eaten, and when the worms were about two-thirds grown, on a warm, still day, I took a cane-pole about twenty feet long, and went into my orchard to see what could be done. I took my stand a little way from a tree, and beginning with the top limbs on that side I shook and jarred them thoroughly; and most of the worms from those limbs let themselves down on their own rope, some to lodge on the under branches, others to hang in the air near the ground; then I shook the next tier of limbs in the same way, and so continued till the whole side of the tree had been thoroughly shaken, and the worms in great numbers hung in the air under the lower limbs; then by horizontal strokes with my pole, under the limbs, and as near them as possible, I let down all the culprits which were within my reach. I then went through the same operation on the other side of the tree. I went to the second and third tree and did the same. Perhaps I was half an hour doing the three trees. Now I had got a large portion of the worms to the ground, but not knowing what they would do with themselves I went to the first tree operated upon, to examine, and I found the creatures determined not to be foiled by this mode of attack; all, from every direction, were scampering toward the tree, and some of them crawling up its trunk. I concluded if I had failed to catch the grubs I could arrest the worms with tar. I directed my man to get some tar and warm it, and bring it as soon as possible. He did so, and perhaps in fifteen minutes he had it there. I brushed down the worms, some of which had got as high as my head upon the trunk of the tree, and he put a belt of tar around each tree. For a while I watched their movements, and found they all knew which way to crawl to find the tree; and after reaching it, rushed upward till all were stuck fast to the tree; and they formed quite a band around each tree. I concluded, as farmers often say, that in my mode of attack I had got the cart before the horse, and that I would change my plan somewhat. I therefore sent my man forward with the tar, and I followed with my pole, in the way above described. The result was I went over forty large apple-trees twice, using fifteen minutes each time on each tree; and although not every worm was destroyed, almost all were—so nearly so that I saw but little of their depredations after the second attack.

"The best time to do this work is on a still, warm day, after the dew has disappeared; then they more readily drop upon their thread when the limbs are jarred than they will on a windy or cool day, or when the trees are wet. If I failed last fall, or if I do this spring, to catch the grubs as they run up, I mean not to fail in bringing down the worms after they show themselves upon the trees. By the above plan I think we may be sure of every worm that we can get upon the ground, for they will persevere until they are stuck fast in the tar. There are now but few homesteads in Newton where there are more than forty large apple-trees upon them. Who, with that number, would sooner lose his fruit, and be obliged to see his trees disfigured and injured by these worms, than to be at the expense of two days' work upon them?"

Another very injurious larva is the caterpillar of the apple-tree moth. Its habits are too well known to require a description here. Of the numerous devices planned for the destruction of this pest, none have proved more efficacious than simply removing with the hand the nest and its inmates at early morning, and crushing the caterpillars beneath the foot. All washes have proved ineffectual, and the brush is not always successful. Pick off every individual, and clean off the nests; and in early spring scrape off the loose bark and moss and burn it, and it will be found that the apple-tree caterpillar can be easily suppressed. The apple-tree borer is also well known as being very destructive, and when its ravages are unchecked the life of the tree is endangered. The presence of one of these grubs may readily be determined on finding on the ground, close to the trunk of the tree, a little pile of the castings of the insect, which greatly resemble fine saw-dust; above this dust will be seen the mouth of the burrow, running into the wood of the trunk. The best method of killing the grub is to thrust a sharpened flexible wire into the burrow until the insect is impaled. In many cases, if the bark and wood around the hole be cut away with a knife, the borer will be exposed to view, when it may be destroyed. It is important that all the holes be thus probed, and that every borer be killed. The following paragraph from the "Fruit Culturist" gives further directions for the suppression of this pest:

"Dig out thoroughly and destroy every worm that can be found, with a jackknife, chisel and knitting-needle; then, in the earliest possible time in the spring, inclose the tree with two thicknesses of hardware paper, dipped in whale-oil soap or gas-tar, partially dried, 12 or 15 inches wide, from the roots up, and loosely tied top and bottom with bass matting. This will require about twenty minutes to a tree, and will last one season."

The codling moth is also well known, its larva boring unsightly holes through the apple in different directions, causing the fruit to drop to the ground, and rendering it unmarketable. There is no method of preventing the deposit of the eggs by the parent moths, but there are means by which their numbers may be greatly diminished. Fires built around the orchard in the evenings of the latter part of June and early in July will attract and destroy the moths in numbers; and all the windfall fruit or other apples lying on the ground should be gathered at once and fed to the hogs. This practice, if followed up, will very greatly tend to keep these insects in subjection.

Among the insects attacking young vegetation, a very generally known species is the striped cucumber-beetle, (often called the striped bug.) Various remedies have been tried against its devastations, but I believe nothing, except a protection for the young vines or other plants attacked, by a gauze or millinet screen, has proved effectual, although a solution of one pound of whale-oil soap to four gallons of water, scattered plentifully over the plants from time to time, has been quite successful. Particular care should be taken to apply this after a rain storm, and it is essential that the under surfaces of the leaves be well moistened with it. Lime, plaster of paris, wood ashes, pepper, &c., have been recommended, but the above seem to be the only ones that can be at all relied on.

Cut-worms are also a serious pest in many localities. As they live, during their larva form, beneath the surface of the ground during the daytime, their presence is rarely detected until a large number of young and thrifty plants have been severed by their sharp jaws. There are several remedies recommended against them. It is said that a handful of oil-meal in a hill of corn will keep the worms employed until the plants are grown too tough for the insect's attacks. I cannot recommend it from personal knowledge, but should say it is worth the trial, as it can do no harm if it does no good, the meal being valuable as a fertilizer. Flour of sulphur scattered on each hill is also well spoken of, as is an occasional application of whale-oil soapsuds, lime, and wood ashes.

The aim of the farmer should be to destroy the worms, rather than prevent their ravages; for this we have proved the following the most reliable plan: Wet the earth on each hill, and thrust down into it, to the depth of two or three inches, a smooth round stick, three-fourths of an inch in diameter, and turn it around several times until the hole made in the ground is on all its sides perfectly smooth; repeat this several times, so that on each hill there are five or six of these holes. The cut-worms in their peregrinations will fall into these traps and can be easily caught and killed. It is a good plan to place around the hills in scattered places in the field a number of old shingles; the cut-worms will hide beneath them from the daylight, and can thus be captured.

The ravages of the currant-worm are now much complained of. The remedy most recommended is to scatter from an ordinary dredging-box plentifully over the bushes, from time to time, the dust of the white hellebore, which can be purchased at any druggist's at a low price.

There are many other species, indeed whole families, who are pronounced by all as being unqualified pests. For checks to the ravages of these I can offer only general suggestions. In orchards the dead grass and rubbish beneath the trees should be removed, and, if practicable, the ground should be ploughed in early autumn. The dead bark should always be removed from the trees, for beneath it the parent insect finds a most acceptable place for the deposit of its eggs. Butterflies and moths should on all occasions be destroyed, and the nests of caterpillars, whether found on cultivated trees or wild ones by the roadside, should always be removed. If care is exercised in these matters, and protection is given to useful birds, a very large proportion of the annual loss by insects will be saved.

IMPROVEMENT OF MEADOW AND SWAMP LAND.

MIDDLESEX SOUTH.

Statement of Isaac V. Adams.

I offer for premium one and one-fourth acres of improved meadow land, situated in the east part of the town of Hopkinton, in Little Cedar Swamp, a tract of land upon which great improvements have been made during the past five years, an account of which may be found in the previous reports of this society.

The lot is twenty rods long, and averages ten rods in width. It borders upon the shore or upland upon one side, and is bounded upon the main channel or outlet of the swamp upon one end. It is a part of a plot of ground purchased in 1861 at $16 per acre. Previous to the commencement of these improvements I had never obtained enough from it to pay for the labor bestowed upon it. In the summer of 1865 it took fire from a neighbor's lot, and a part of it was pretty well burned over. I immediately commenced operations upon it, by deepening and straightening an old ditch which passed through it at a distance of three rods from the shore, emptying into the main channel. I accepted an offer from a neighbor to cut a ditch across the further side, in consideration of which he was to receive the mud flung out. This ditch, like all my cross-ditches, is three feet wide at the top, two feet at the bottom, and about three feet deep. Having completed the arrangements for thorough drainage, I levelled up the surface beside the ditch which had been straightened and put the piece under the plough. The part which had been burned ploughed easily with a light yoke of cattle without a driver, but the remainder was very tough, and required two yoke of oxen and two men. After suffering it to dry for a few days, I set it on fire, and obtained quite a good burn, except upon a small portion adjoining the upland, where sand had been washed in by the summer rains and mingled with the peat. Where this has occurred it is impossible to get a good burn. I now sowed all, except the portion last spoken of, with winter rye.

In the spring of 1866 I ploughed and harrowed the remaining part, and planted it with two and one-half bushels Jackson White potatoes, applying two loads of manure of twenty-five bushels each. The potatoes were hoed twice, and pains taken to work over the tough places faithfully. The yield was twenty-five bushels. The rye yielded nine bushels of grain and eighteen cwt. of straw.

In December, from a hillside near by, I carted and spread seventy-five loads, of twenty-five bushels each, of coarse sand, varying the depth of the application as the condition of the soil seemed to require. The bogs were all cut away and other obstructions removed, so as to leave the surface entirely level.

In the spring of 1867 I harrowed down the rye stubble, and, without ploughing, furrowed it out, and putting one-half shovelful of compost in the hill, planted corn upon all except the toughest part. Upon the latter part I planted, after ploughing as well as I could, one and one-half bushels of Jackson White potatoes. The crop was hoed twice, grew rapidly, and yielded ten bushels of potatoes, eighty baskets or forty bushels of corn, and one and one-half tons of stover.

After taking off the corn and potatoes I ploughed and harrowed, raked the corn-roots into low places and covered them with peat, and sowed grass seed. As the seed was of my own raising, I cannot state the quantity accurately, but my estimate is one-half bushel of redtop and one peck of herd's-grass.

The grass came up thick and looked well early in the season, but the unusually large amount of rain proved unfavorable to a heavy crop of hay upon wet lands, and the yield (eighteen cwt.,) was not as large as may be expected in ordinary seasons. The second crop is looking well.

In the selection of farm help, I have been successful in securing young men at a price not exceeding $1.50 per day, and this is the basis upon which I calculate the expenses of this experiment.

EXPENSES.

1865.	One acre land, ...	$20 00
	Tax of improvement commissioners, . .	5 00
	20 rods ditch, at 50 cents, ...	10 00
	Three-fourths bushel seed rye, . . .	1 50
	Eight and two-thirds days' labor, . . .	13 00

1866.	Two loads manure,	$3 00
	Two and one-half bushels seed potatoes,	2 50
	Ten days' labor,	15 00
	Seventy-five loads sand, at 15 cents,	11 25
1867.	Seven loads (25 bushels,) manure,	10 50
	Seed potatoes and corn,	1 50
	Grass seed,	2 00
	Twenty-one days' labor,	31 50
1868.	Six pounds clover seed,	1 00
	Sowing,	25
	Mowing one and one-quarter acres,	1 88
	Raking and carting hay,	2 87
	Total expense,	$132 75

PROFITS.

1866.	Nine bushels rye, at $1.75,	$15 75
	Eight cwt. straw,	8 00
	Twenty-five bushels potatoes,	18 75
1867.	Forty-five bushels corn, at $1.50,	67 50
	One and one-half tons stover,	13 50
	Ten bushels potatoes,	10 00
1868.	Eighteen cwt. hay,	18 00
	One and one-quarter acres land,	125 00
		$276 50
	Deduct expenses,	132 75
	Net gain,	$143 75

HOPKINTON, August 15, 1868.

FRANKLIN.

From the Report of the Committee on Reclaimed Swamps.

The Committee, on whom devolved the duty of examining and reporting on reclaimed swamp lands, having performed that service, offer the following Report as the result of their doings: There was but one application made for premium—that of T. L. Allis, of Conway—three and one-half acres of bog or marsh land, that in 1863 was a worthless marsh. Ninety rods of underground drain were dug three feet deep, and one and one-half feet of small stone was laid in the bottom, then covered with hemlock brush, then with dirt, at a cost of sixty cents per rod. It was then broken up with a plough, the bogs being turned over with a dung-hook. In the spring of 1864 it was manured at the rate of twelve cords of manure to the acre, and one acre was set with tobacco; the remaining two and one-half acres were planted with corn, using one spoonful of phosphate in a hill. There was a fair growth of stalks, and about thirty bushels of corn per acre. Yield of tobacco, one ton.

In 1865 the entire three and one-half acres were set to tobacco; there was used twelve cords of manure to the acre; crop, 700 pounds. In 1866 there was sowed to oats one acre; raised sixty bushels. The remaining two and one-half acres were set with tobacco, using twelve cords of barn-yard manure and 600 pounds of phosphate to the acre; crop, 5,000 pounds. In 1867 one acre was mowed; the remaining two and one-half acres were sowed to oats, and seeded with three pecks of Timothy per acre. The crop of straw was very heavy; oats, 160 bushels. In 1868 there were mowed and carted off from the above three and one-half acres eighteen ox-loads of hay, thirteen first crop and five second crop, judged to weigh, cut, fifteen tons. The said plat of land lies from one to two degrees to the west, is rather loamy soil, a hardpan bottom. The sensation produced by witnessing this productive meadow, so lately reclaimed from a worthless bog or marsh, by Mr. Allis, cannot but be a source of delight to all beholders, especially to the owner thereof, and those whose tastes harmonize with such improvements, affording the careful observer the best possible proof of the utility of such improvements.

It is no longer an experiment, but an admitted fact, that such reclaimed lands are more productive, and yield a greater profit than any other in proportion to the amount invested in improvements; and it is gratifying to observe the progress annually made in this kind of improvement. Different local circumstances may require a somewhat different process to be adopted; but the Committee are satisfied, from their limited experience and observation, that unless it be possible to drain such lands, all attempts at reclamation are futile and visionary. The roots of all plants are not insensible to the influences which are felt by the stems and branches above, although they burrow below the surface of the ground. On the contrary, they are fully as sensitive to the extremes of moisture and dryness, or of heat and cold. Nor is the access of air less important to one than to the other; both extremities of plants feed on air, the roots more than the leaves.

Hence it is that the condition of the air which circulates in the ground, the temperature of the soil itself, and the moisture contained therein, require to be regulated as well as that of the atmosphere above ; and hence the importance that underground climate should be thoroughly understood. For our land is not merely wet but water-logged, all the space between the particles of earth being filled with water, and consequently destitute of air, except a small quantity which may be contained in the water. By this means the plants are deprived of the most essential part of their food. But when the water is removed, air takes its place and holds in suspension sufficient moisture for the roots to subsist upon, for it is not water in a fluid state which plants in general prefer ; it is when it has assumed the state of air-borne vapor, the best of all food for roots. Hence it is evident that drainage produces a very important effect upon land by raising its temperature and communicating heat to the roots of plants. All practical farmers know the value of this, as the soil requires to be heated in some degree for all plants ; but some kinds demand a higher temperature than others.

The reason why drained land acquires an increased temperature, is that water-logged land is always cold, and consists in a well-known fact that heat cannot be transmitted downwards through water. The nature of deep draining, then, is in fact such as to change the underground climate by admitting an additional access of air and warm rain to the roots of plants. It is only when deep draining and deep trenching accompany each other that much increased access of air to roots, beyond what is customary, can be anticipated ; where both are secured the effect on vegetation will certainly appear like magic, as the Committee could readily see while viewing the three and one-half acres offered for premium by Mr. Allis ; also showing to the Committee the perseverance and good judgment of Mr. Allis in under-draining, and thereby improving worthless land.

Your Committee feel well satisfied with the results already attained; they most cheerfully award to him the highest premium offered by the society, (five dollars.) Our farms in Franklin County are capable of productive improvement. Would it not, then, be advisable for the agricultural society to give more encouragement to farm improvement by offering a higher premium for converting swamp lands into English meadow? The entries made for such improvements for the last two or three years have been very few. We are sorry to find no more competition for this premium. The Committee trust that Mr. Allis' example will call the attention of farmers to their worthless lands, and that this society will have numerous experiments before it with an approach to the real value of the improvement. We have the satisfaction, however, to report that this subject is receiving increasing attention; that a very considerable number of our substantial farmers are taking their first step in this direction; and we confidently predict that the next five years will witness results from this method of improving the worthless and worn-out lands in the county, on the hill-tops as well as the valleys, which at the present time we should hardly anticipate. Some of the most valuable farms in the county of Franklin are situated on the summits and declivities of the hills in Shelburne, Conway, Colrain and Leyden. Some of those farms are wet and consequently backward, and cannot be worked in early spring, subjecting the owner to the necessity of cultivating mainly the various grasses. Now, as man cannot live on grass alone, we would suggest to the proprietors of such farms to try the experiment of under-draining one acre, at least, that they may have the satisfaction of regaling themselves, as early as the Fourth of July, with pease, potatoes and other vegetables, raised on their own land. It will be gratifying to be able to cultivate one acre of drained land almost as soon as the frost is out, rather than to wait, as formerly, till a dry spell would, by degrees, evaporate the surface-water, leaving a hard crust on a cold under-soil, when previously it was difficult getting about on the field. A wet soil, that has no way of freeing itself of an excess of water but by evaporation, will be cold, and the crop will be both later and inferior to what it would be provided the soil was freed from this excess of moisture by drainage. Crops are also more liable to injury from frosts, both late and early, over undrained lands. The most serious objection made to this permanent improvement in farming, under-draining, is its cost. To quote a vulgar but significant phrase, "It will not pay," says the farmer. If this be true, if experience and observation, after having given thorough draining a fair trial, shall confirm this prediction, then none but fancy farmers will adopt it, for all matters in farming that fail to stand this test must ultimately fail. And it would be strange indeed if the theory that nearly all lands in Franklin County need under-draining, did not meet sturdy objections, clad in economy, earnestly and in good faith, contending that such a radical improvement will never pay. With such the advocates of thorough draining should not spend much time in arguing the question, but rather in collecting facts, such as experience has evolved and observation confirmed. Observation and experience have taught the writer that the whole cost of draining swamp land has been more than paid by the first crop taken off after draining. One of the best and most successful experiments made in thorough draining of land in this county is that executed by Mr. Allis, of Conway. He has nearly or quite completed the under-draining of his entire farm. In doing this he has constructed about two miles of drain, and used six cartloads of stone to every five rods of drain. In addition to draining in this county, we must introduce deep and thorough tillage, and besides make a liberal use of fertilizers. The earth, thus treated, will be found a liberal rewarder, returing the husbandman some thirty, some sixty, and to others even a hundred fold. They who drain and till deeply and thoroughly, and sow liberally shall reap bountifully, and thus have the satisfaction of seeing the work of their hands prosper.

Anson K. Warner, *Chairman.*

HOUSATONIC.

From the Report of the Committee on Reclaimed Lands.

The Committee appointed to examine orchards set in the spring of 1865, and unproductive lands, both to be reported on and awards made in 1868, have attended to and performed said duty, and submit the following Report:—

There were six pieces of land, containing not less than one acre each, all of which could be greatly improved by a reasonable application of labor. The piece owned by Orrin Curtis, of Sheffield, was on the west side of Harmon Pond, and nearly on a level with the same, mostly muck-covered, with bogs, hard-hack, &c., the highest part covered with alders and other small wood, with a clay subsoil—a most forbidding-looking piece of land, if it might be called by such a name.

Theodore H. Fenn entered one acre, on the west side of Negro Pond Swamp, a piece entirely unproductive, where cattle could not walk on a considerable part of it, covered with bogs, hard-hack, alders, large pine stumps, whortleberry bushes, &c.; soil, muck, clay and gravel subsoil.

John Hale of Tyringham, had in process of reclaiming some three or four acres; can be thoroughly drained; soil, decomposed vegetable matter, washed from the hill east of it by a brook running through the same.

The above lands have been examined three times by a majority, or at least some one or more of the Committee, viz., in September, 1865, 1867 and 1868, they having witnessed the progress and success of the competitors. Your Committee avail themselves of the statements of the competitors, and append the same as a part of their Report.

Statement of Orrin Curtis.

Dr.

1865.	To labor on main ditch, ...	$10 00
	Under-drains, with plank bottoms, and filled with stone, ...	15 00
	Taking out brush, trees, hard-hack, &c., by the roots, ...	35 00
	Spreading muck from the main ditch, and harrowing in grass seed, &c., ...	5 00
	Grass seed, Timothy and redtop, . . .	5 00
	Three loads manure, ...	3 00
1866.	To cutting brush and weeds, and ploughing on the part joining the upland which was not finished last fall, ...	15 00
	One under-drain, commencing near the lines and running east six rods and south four rods to main ditch, ...	12 00

1866.	One ditch, near the centre of lot, running from the upland south to main ditch, with boards and poles in the bottom, and filled with small stones,	$6 00
	Harrowing, pulling roots and carting them,	3 00
	Grass seed, redtop and Timothy,	4 00
	Three loads manure,	3 00
	Making and carting about four tons hay to barn,	12 00
		$128 00

CR.

1865.	By five loads wood,	$10 00
1866.	By fifteen loads of brush, weeds, muck, &c., drawn to the upland, 20 cents per load,	3 00
	Picking small stones from the upland to fill ditches, twenty-five loads, 20 cents per load,	5 00
	About one ton of hay or grass standing,	8 00
1867.	About four tons hay put in barn,	48 00
1868.	About four and one-half tons of hay standing on the lot, at $8 per ton,	36 00
		$110 00

Statement of T. H. Fenn.

In the fall of 1865, immediately after the examination of your Committee, I commenced taking out the bushes, alders, willows, hard-hack, stumps and bogs, most of which were removed by hand labor, as it was impossible to use a team on parts of it. A large quantity of wood, the roots of stumps and bogs, buried in muck, were discovered on removing brushes and bogs, which had not been seen by me before. Ditches were made to nearly surround the piece, and which, by taking off the water, greatly aided me in drying and reducing to ashes the debris on the same. The account will stand nearly as follows:

DR.

To one half expense of ditches,	$7 50
Bogging and removing brush, stumps and logs on the acre, twenty days, at $1.50 per day,	30 00
Burning debris, six days,	9 00

To drawing off stumps with team,	$5 00
Grass seed,	4 00
Eight loads manure on part of it,	8 00
	$63 50

Cr.

By ten cords of wood,	$20 00
Sixty bushels ashes, at 10 cents,	6 00
Ten bushels turnips, at 25 cents,	2 50
Six bushels buckwheat, at 95 cents,	5 70
Four bushels pease in pod,	4 00
One and one-half tons hay standing,	9 00
	$47 20
By balance charged lands,	16 30
	$63 50

The ditches were made at 25 cents per rod.

Statement of John Hale.

The piece of land that I entered for improvement was, in 1865, a swamp covered with stumps and brush. I commenced by cutting a ditch through one side of it, and in 1865, removed most of the stumps and brush, and hoed into the muck potatoes on a part of it, from which I have harvested a good crop.

In the fall of 1866 I worked a few days in getting out stumps, &c., but the season was so wet that I did not do as much as I wished to. In 1867 I ploughed it with a heavy plough and two yoke of cattle, and this season I dragged it thoroughly and sowed buckwheat, and got a fair crop, and my land is now ready for the grass seed. Then I think my land will be worth $100 per acre. It was of little value before I commenced improving it. I have expended about $50 per acre, for which my crops would credit some $12.

D. B. Fenn, *Chairman.*

MANURES.

Special or Concentrated Fertilizers.

ESSEX.

Essay by Dr. James R. Nichols.

Nothing more readily attracts the attention of farmers, or conveys more palpable ideas of value, than *bulk* in manurial substances, and yet nothing is more deceptive or fallacious. A huge bank of animal excrement under the eaves droppings of the barn has indeed a positive value, but it does not consist in the great mass of the material of which it is made up. Squeeze out the water, remove the sand and chaff, and we can place all the fertilizing elements of that heap in the smallest-sized dump-cart. The high value of stable or barnyard manure is not found in the eighty or ninety per cent. of water, silica, &c., which it contains, but in the nitrogenous elements—the potash, soda and phosphatic salts, which in amount occupy relatively a most insignificant position. And I may say further, that the excrementitious salts found in the manure heap have the highest positive value, as plant-food, of any substances with which we are acquainted. They exist in a form ready to be again taken up by plants and assimilated into the living organism. They differ from the same class of agents found isolated in the hands of the chemist, inasmuch as they have had conferred upon them in their passage through vegetable and animal structures a kind of vitalized capability, the nature of which is imperfectly understood by chemists.

But the deceptive nature of bulk in fertilizing agents is not confined to barnyard manure. Leaves, peat, muck, chaff, &c., need to be carefully examined in order to understand their actual value to the farmer. I have been led during the present autumn to make somewhat extended analyses of these substances with the view of testing the correctness of some published statements regarding them, and also to learn of how much positive service they may be to the farmer. A bushel of well-pressed dry leaves as they fall from the trees in autumn weighs about four pounds; by further drying they part with a little more than thirty per cent. of water held in the cells of the leaf structure. A cord of absolutely dry leaves will weigh about 325 pounds, reckoning 100 bushels to the cord. In weight, then, a cord represents about one-twelfth of a cord of wet barnyard manure, and if they contained the same amount of fertilizing material in the same condition would be equal in value to that amount of manure. But this is far from being the fact. The dried leaves I have found to stand relatively to the leached organic matter of manure as 10 to 30, in ash value, and when the soluble salts of manure are taken into account the comparative value is as 10 to 60, weight for weight. A cord of dry forest leaves, made up of the usual deciduous varieties, maple, beach, oak, &c., has an actual *manurial* value of not over *fifty cents*, reckoning good stable manure at eight dollars the cord. Will it pay to collect them? Certainly not for the amount of fertilizing material they contain. As litter or absorbents in the stable, leaves have some value; but much less than straw, inasmuch as they lack the reedy character of straw, and because they are far more difficultly and slowly decomposed.

A pound of good, thoroughly formed peat, taken fresh from the meadow upon my farm, lost of water in drying a little more than fourteen ounces. A farmer drawing from his meadow a cord of peat weighing 4,000 pounds has upon his wagon 3,500 pounds of water and but 500 pounds of the dry material he seeks. This, dried and compressed, could be placed in a couple of our largest-sized farm baskets. The amount of ash constituents in the pound of peat after drying was a little less than 10 per cent.; so that when we reduce the heavy load of peat, which to the eye appears so bulky and valuable, down to its contained inorganic principles, we find the whole amount to be less than 50 pounds. I hope not to be misunderstood in the matter. The ashes are far from being the only manurial part of peat; and as in burning some of the most valuable elements are volatilized and lost, it is not good economy to burn peat for the purpose of securing the ashes. Fresh peat allowed to ferment in contact with lime is changed into new substances capable of nourishing plants, and where it can easily be obtained it pays the farmer well to secure a good supply. I cannot help remarking, however, in this connection, that many of the statements made by our chemists and journal writers regarding the value of muck or peat are simply absurd, and are proved erroneous by practical experiment. The great value of peat, after all, lies in its absorbent qualities. From the experiments and experience of a considerable number of years, I feel more inclined to urge the farmers of our county to save the *liquid excrement* of their animals by the use of seasoned peat in their cattle-stalls and manure-pits, as an absorbent, than to recommend them to drag it many miles, at much expense, to be used by itself or in compost, for fertilizing purposes.

How strangely we overlook the value of the liquid excrement of our animals! A cow, under ordinary feeding, furnishes in a year 20,000 pounds of solid excrement, and about 8,000 pounds of the liquid. The comparative money value of the two is but slightly in favor of the solid. This statement has been verified as truth over and over again. The urine of herbivorous animals holds nearly all the secretions of the body which are capable of producing the rich nitrogenous compounds, so essential as forcing or leaf-forming agents in the growth of plants. The solid holds the phosphoric acid, lime and magnesia which go to the seeds principally; but the liquid, holding nitrogen, potash and soda, is needed to form the stalk and leaves. *The two forms of plant-nutriment should never be separated or allowed to be wasted by neglect.* The farmer who saves all the liquids voided by his animals doubles his manurial resources every year. Good seasoned peat is of immense service to farmers when used as an absorbent, and the stalls for animals should be so constructed as to admit of a wide passage in the rear, with generous storage room besides, for peat, to be used daily with the excrement.

The remarks above made may be regarded as preliminary to some brief general statements upon another branch of the subject of fertilizers. With a proper idea of what really constitutes plant aliment, and of the physical and chemical nature of the bulky substances in general use, the inquiry very naturally arises, Why cannot the concentrated principles of such be obtained through other channels, and used more economically and directly upon our lands? An answer to this inquiry opens up the whole subject of the value and use of special or concentrated fertilizers; and this is a subject which has been so often and so fully discussed by theorists and others, that the reader will not thank me for going over the ground again. Upon no subject connected with agriculture does a wider difference of opinion prevail, and the discussion of the subject in the usual unsatisfactory empirical way does not tend to settle disputed points or clear away the clouds of doubt which hang around the whole matter. Experiment usually decides controverted points in matters of physical inquiry, and it is capable of reaching this end in the subject under consideration ; but it must be made carefully, intelligently, and be long continued. Having entered upon a series of experiments of this nature, with the determination to make no report for at least five years, or until soils could be carried through a period long enough to observe the effects of disturbing influences, and also learn something regarding the growth of different crops, and the lasting effects of peculiar modes of treatment, I find myself at a point of time when it is proper to examine and make known results. The time and space allowed me in this essay do not admit of detailed statements, and such must be reserved for another channel of communication, if health and strength permit.

The experiments have been made upon a farm of about eighty acres, which was purchased in 1863, with the view of entering upon a course of experimental inquiry interesting to agriculturists. The question deemed most important to decide, was whether a run-down farm could or could not be brought into comparative good tilth by the employment of fertilizing agencies outside of stable and barnyard manures. The farm, at the time of purchase, was well suited to a trial of this kind, as it had been in administrators' hands for several years, and was consequently neglected and unproductive. The soil is varied in its character, with upland and lowland, a fine peat bog occupying a basin between the hills. A portion is silicious, another portion loamy with a clay subsoil, and still another part is rich in organic debris, a forest having until within a few years densely covered it. Perhaps no tract of land in our county presents a greater variety of soils, of differences of exposure, or affords the gradations from wet to dry, so desirable for fair experiment. The product at the time of purchase consisted entirely of hay, about twelve tons being produced, of indifferent quality. The crops the present year, upon lands embraced in the original purchase, have been thirty tons of good hay, one hundred bushels of potatoes, twenty-five bushels of wheat, one hundred and fifty bushels of corn, seventy-five bushels of turnips, and one and a half tons of grapes, besides other fruits in considerable quantities. There has been a steady increase in the amount of crops each year, notwithstanding a series of most unfavorable seasons. The number of acres in tillage is not far from twenty. No stable or barnyard manures, excepting a few loads at the start, have been purchased during the five years, and the amount made upon the premises has been small, the stock consisting, until within the past year, of only three cows, a pig and one horse. At present the farm sustains eleven cows and heifers, three horses, a pig, and, during a part of the year, one yoke of oxen.

The fertilizing substances used, (of which an accurate account has been kept, as also of crops, expenses of labor, &c.,) embrace the entire range of those agents which chemistry suggests, and those which have been brought to notice through the recommendation of farmers and experimenters—bones, ashes, lime, salt, the nitrates of potassa and soda, sulphate of ammonia, plaster, potashes, fish pomace, shorts, muck, horn shavings, and lastly the refuse of the Maine lobster factories. The methods of application, and the conditions under which these have been employed, the combinations produced, present details which, although extremely interesting, are too extensive to enter upon in this essay. A definite end has been kept in view—that of securing practical facts, from which safe general conclusions could be reached. Of course many experiments known to be empirical have been undertaken, and the results noted. For example, a half acre of grass land was divided into eighteen equal parts, and eighteen different substances applied; the results were curious, but the experiment actually proved nothing, although a great difference was observable in the crops of grass. More than one-half of the experiments which we find reported from year to year are of this nature. The substances affording the highest satisfaction have been those which furnished, in largest quantity and at the lowest rates, the great fundamentals of plant-food,—phosphoric acid, lime, potash, nitrogen. These have been obtained from bones, ashes, potashes, fish pomace and nitrate of soda principally. Bones have been largely dissolved in acid, and true phosphate and superphosphate of lime made upon the farm premises. Bones ground and unground have been dissolved in the caustic lye of ashes, also in commercial potashes and fertilizing substances of the most prompt and satisfactory character produced. I doubt if better crops of wheat and corn have ever been produced in the county than have resulted from the use of these agents upon weak lands. I think it must be conceded that the results of these labors go to prove that exhausted soils can be brought and sustained in good tilth by concentrated chemical agents, at an expense considerably less than by the use of excrementitious manures, at present market prices, in the more densely populated parts of our country. In conclusion, I will briefly present some facts regarding a special experiment upon a measured acre of hill land, dry, and exhausted from repeated croppings. It has been continued through five consecutive years. In the autumn of 1863 it was ploughed, and in the succeeding spring dressed with five hundred pounds of pure fine bone, sown broadcast, and planted with corn, a handful of homemade superphosphate mixed with ground nitrate of soda placed in each hill. One hundred and fifty-seven bushels of corn in the ear were taken from the field in the autumn of 1864. After the corn was removed, the land was ploughed and again dressed with five hundred pounds of a compost made up of bone-dust, ashes and refuse saltpetre, and sowed down to winter rye. The crop was thirty-one bushels of nice, plump grain. The season of 1866 was exceedingly dry, and the ground became so parched that the tender grass roots were greatly injured. The crop of hay was twenty-three hundred pounds. The next season a top-dressing of five hundred pounds of compost, made of bone gelatine and muck, was given it in the spring, and a crop of hay cut weighing forty-three hundred pounds. A heavy aftermath was secured this season which was not weighed. The present season the crop of hay reached two and a half tons, and the field appears to be in good condition for a fine product next year. Here we have what may be considered a fair experiment, which proves that without the use of animal excrement a worn-out field may be brought to produce very generous crops—crops which pay a good return for the expense incurred. It proves that chemical unorganized agents are capable not only of supplying nutriment to plants for a single year, but for sustaining crops for a series of years. The fertilizing elements supplied for the five years cost a little less than thirty dollars. The experiment upon this field is not regarded as finished, and the crops will be noted until they are observed to falter.

WORCESTER WEST.

From the Report of the Committee.

The ability of the farmer to succeed in improving his soil and grow greater crops depends on his applying to the land a plenty of manure, either from the resources of his farm or other sources. As our land is growing older and becoming worn and more sterile, greater pains should be taken to procure in some way the necessary means of enriching it. Barn-cellars ought to be kept well supplied with absorbents, in the form of meadow mud, scrapings from the roadside, old head-lands, fallen foliage from the trees, and other materials for absorbing the liquid droppings and preventing in a measure the escape of volatile fertilizing qualities. The compost heap should not be neglected; the leisure moments ought to be devoted more to making a larger heap every year. By constant care and attention the farmer may make a large quantity of valuable manure, and in this way save a large expense for fertilizers, compounds and patent manures. If farmers in general could be persuaded to avail themselves of all the opportunities they have of making compost of all the materials they have that fall in their way or can be easily obtained, we should not hear so many complaints as we now do of short crops and worn-out lands.

Cheese factories, with their many advantages, have, in our estimation, one great disadvantage: the whey being spent at the factory deprives the farmer of valuable means for keeping many hogs on the farm. Formerly many of our farmers usually had a good supply of material for enriching the soil from this source. The filthy swine are very industrious in their way, although they appear to know nothing of what they are manufacturing. Give them plenty of the raw material, either in the piggery or barn-cellar, and they will soon produce an article of much value in the various departments of agriculture. This loss must be supplied in some way or our farms will deteriorate. Greater pains should be taken to save everything that can be applied to the soil with beneficial results. In order to insure success we must save closely and apply bountifully enriching materials to the soil; but that manures may fully answer the best purpose they must be judiciously applied. We should apply a manure to the soil for which it is most suitable, and at the season when it will produce the most valuable effects. In their application there are various opinions as to the best mode and time of applying them. Some plough them in deeply, some cover them slightly, others spread on the surface and leave them uncovered; on grass ground, some spread in the spring, others after haying, and some in the fall.

As a general rule, it is best to apply manures as near as may be to the time when the ground is seeded, and on grass when the grass begins to grow. The reason for applying manures at this time is obvious. They furnish food for plants as soon as their mouths are open to receive food, or, in other words, as soon as the plants begin to grow. The plants will then receive the greatest quantity of nourishment at the time when it is most needed. From practice and observation, your Committee think the best time to manure grass is early in the spring; the best manure is green manure from the stables where the cattle are bedded with straw, and spread evenly on the surface. The litter tends to keep the soil light and protect the roots of the plants from the hot sun and drying winds, like the leaves in the forest, and the young grass soon shoots above the mulch, forming a kind of sponge that keeps the moisture of the dew and rains much longer on the surface than it would otherwise. If the society should enlarge the premium on manures, and the application of them, so as to induce many to compete for the society's bounty, it would do much towards growing larger crops and increasing the fertility of the soil. We would suggest that if the premiums on fast horses and manures were reversed, one for the other, a greater benefit would be conferred on this community than now by the society's premiums

J. Addison Merriam, *Chairman.*

ORCHARDS AND FRUITS.—APPLES.

ESSEX.

From the Report of the Committee.

Perhaps the most noticeable apple upon the tables was the Hubbardston Nonesuch, which has of late years been growing more and more in favor ; and this year it excels all others, both in size of fruit and productiveness of the tree. This is probably now the best apple of its season, while the Baldwin, Russet and Greening still continue to be the best long-keeping varieties. Among earlier apples, the Gravenstein is looking remarkably well ; while its companion, the Porter, is generally, this season, small and inferior. We believe the apple, more than almost any other fruit, is local in its character, and that those varieties which originated in this vicinity, and have proved superior here, have generally, for a term of years, been the most profitable and best suited to our soil and climate. There are some exceptions, certainly, but we would caution those who are planting or grafting trees not to be misled by the high-sounding names and praises of many of the New York and Western apples.

We would respectfully suggest to this society, that in our opinion some of the varieties upon its list are not worthy of cultivation ; and your Committee believe, judging from their observation from year to year, that no really good specimens are or can be brought to the exhibition of such varieties as Seaver's Sweet, Ramsdell's Red Sweet, Jonathan, Fallawater, &c., and we have thought it best not to award premiums to them.

We would advise planters to confine themselves to a few varieties, and those of the highest excellence. But in dealing with facts, we admit that apples do not flourish as they formerly did ; that the trees, as a general thing, look badly ; many are dead, many more are half dead, while others look green and vigorous. These last are usually found where they have been planted in a congenial soil, have been properly trimmed, and in most cases cultivated, and above all, have been protected from the cankerworms where the scourge has visited them.

Many of the pomological writers of the present day are regretting the failure of the apple crop, attributing it to a lack of phosphates, lime or some other ingredient in the soil. They say, and with much truth, that the apple-tree requires a new or virgin soil, and that apple culture is being abandoned for that of the pear, &c. It is our opinion that apples will again do well; that they are more valuable and more generally useful than any other fruit in our climate, and as profitable as any other farm crop.

It will be remembered—at least in the northern part of the county—that the canker-worms, in 1864 and 1865, were more numerous and destructive than at any other period; and the long protracted droughts of those years, especially of 1865, when the limbs, entirely stripped of leaves, remained through the summer and fall exposed to the sun, and the ground so dry that many of the surface-roots actually perished. This, we think, will explain why there are so many dead and decaying limbs upon the trees, and why the fruit failed to "set" the next spring, although there was a good bloom. This season and the last, having been favorable to the growth and recovery of the trees, we predict a good crop next year, where the trees are in bearing order.

We would advise then to cut down all trees that are past recovery, thin out where they stand too thick, and gradually cut off all dead and decaying branches. Shallow ploughing, especially in the fall, is beneficial; in fact, the soil in an orchard should always be kept loose and broken. Above all, protect your trees from the canker-worm. Our most intelligent farmers now, having tried the various "patent protectors," use generally the printers' ink, or the old-fashioned article, tar. One enterprising farmer, who has a large crop of apples the present season, uses printers' ink reduced somewhat with rosin oil, put on with a paint-brush, upon strips of tarred paper tacked around the tree. He commences in the fall, and applies it as often as necessary (in from three to six days,) during the "running season," with one or two applications at the time the buds start, to catch the worms that were hatched below the tarred paper. Some of the ink that is manufactured on purpose, and sold as "bug exterminator," is not worth applying, as it is poor and dries sooner than tar. The greatest objection to the ink is, that the surface dries or coats over so rapidly, especially during cool nights, (and is again soft in the daytime,) that the grub walks over it with impunity. Cannot some of our chemists look into the matter, and give us something that will remain sticky for a long time, or else that will poison the grubs? We saw one very successful experiment tried last year, where the ground was ploughed about four inches deep just before it froze up for the winter. The worms were very plenty in the orchard the year before, but this either killed them or frightened them away, for there were none there of any consequence this year.

Other insects, as caterpillars, borers, &c., are more easily exterminated, and should be in all cases where they exist.

For the Committee,

T. C. THURLOW.

MIDDLESEX NORTH.

From the Report of the Committee.

APPLES—FIRST CLASS.

In some towns within the limits of our society the crop of apples is small; but chiefly in parts where better attention was paid to fruit-growing the crop is good. The blossom was full, but the unfavorable weather which immediately followed caused much of the young fruit to blast.

Some people think they perceive a tendency in apple orchards towards a general deterioration, the same as we see in peaches and plums. Happily our most intelligent fruit-culturers do not participate in this idea, but urge—and practise what they urge—a more careful and thorough cultivation of the apple. The means of information upon these points are so ample at the present day that any suggestion from us, in this report, would seem out of place. Apples are a staple commodity, profitable to raise, healthy to eat, unequalled by any other fruit for culinary purposes; they are one of the necessaries of life, and we hope to see their cultivation greatly extended in the towns about Lowell. It has been fully demonstrated that with proper cultivation most of the varieties of apple-trees will thrive and bear well in our soils. We say set more apple-trees. There is no danger of overdoing the business.

One thing we would urge: that contributors pass in a statement in regard to the peculiar characteristics of the articles exhibited for premiums—if fruit, its keeping qualities, &c., growth and habits of the trees, mode of cultivation, &c. This is just what our young farmers and fruit-growers want to learn —not who that has acres of orchards can select the most showy specimens from twenty different trees. Premium articles may be got up for a show in a very neat manner by having a wide field to select from; but what do they cost? If you with the same advantages can raise equally as good fruit at a less cost than your neighbor, then it seems to us you are entitled to the premium, and you in turn should let the world know your method of producing it. It is to be feared the present management and mode of awarding premiums by our agricultural societies does not go far to advance us towards the ultimate objects for which they were established.

A. Rolfe, *Chairman.*

APPLES—SECOND CLASS.

Your Committee in performing their duty were governed by rules which we believe the fruit-growers will approve. We first noticed the varieties offered, whether they were of the more profitable or the large and more fancied varieties, giving the preference to such as the Pippins, Hubbardston, Baldwin, &c. We also took special notice of the quality, examining in most cases every apple; by so doing the largest in some cases did not get the premium. We considered a good, sound, perfect (we do not call a wormy one perfect) apple, of good variety, though less in size, more worthy of a premium than larger specimens, wormy and of a variety perhaps almost worthless. We wish that future committees might do the same.

The care of the tree has much to do with the quality of the fruit. We believe that an orchard should never be seeded down to grass, but let the plough and harrow do their work. But if it must be, then the trees should be mulched with old hay and the like, as far as the limbs extend, in order to keep the ground light and moist. There is something that requires the attention of the orchardist continually. Besides the preparation of the soil, his trees need pruning; the borer, caterpillar and canker-worm are to be looked after in order to insure success. A remedy for these evils is of the utmost importance. The writer has successfully practised the following: To secure the borer take a small brass wire with a hook or beard on one end; on examining the tree you soon learn where he is by the chips at the base; these removed and the wire sent up after him will, in nine cases out of ten, bring him out. The caterpillar is very easily disposed of with the hands and brush. The canker-worm, which is the most troublesome of all, requires more careful attention. There have been various means used to prevent the female from going up the tree and depositing her eggs. The only preventive that I have seen tried, that will accomplish the object, is tar. My way of applying it is this: Take a strip of tarred paper four or five inches wide, and fasten closely around the body of the tree, then apply the tar. The tar should be as thin as may be, without running. It will very readily be seen that when they attempt to go over they are caught at once, as they cannot fly. When it should be done is quite important. A few go up after the first hard frosts in the fall, but most of them as soon as the frost comes out in the spring. The trees must be examined at both seasons, and if they are found to be on the move, then commence to tar, and continue to do so as long as there is any to be caught. Just at night is the best time to apply it, as they go up more at that time. Don't let the tar get dry if you have to apply it more than once a day. The expense is a mere trifle. The price of apples for the last three years will warrant a little extra exertion, at least to rid ourselves of these troublesome pests.

S. F. HOSMER, *Chairman.*

NORFOLK.

From the Report of the Committee.

On invitation of David Shaw, Esq., of Foxborough, received through the secretary, September 7, the Committee proceeded to Foxborough, September 14, for the purpose of examining the apple orchard of Mr. Shaw, entered for the society's premium.

The orchard embraces about one hundred trees, occupying two acres of land. The trees were obtained from a nursery in Sherborn, Mass., Mr. Shaw thinking them better adapted to his grounds and exposure than those raised in a more southern locality. Fifty of them, divided equally between Baldwins, Greenings and Russets, the portion especially entered for premium, were set out sixteen years ago, twenty feet apart. Great care was taken in planting. The ground was deeply ploughed, and has been kept under cultivation every year, cropped with potatoes and corn, until the trees became too large to admit of crops. Barnyard manure has been used with the crops at the rate of three and one-half cords per acre. Of late he has used a wheelbarrow of manure to a tree in the fall, and the same in the spring, well spaded in. Mr. Shaw has washed his trees with soft soap about the first of July, and at the same time has examined them for borers; these, when found, he cuts out and destroys with the knife and the wire, unless too deep to be reached, in which case he drives a nail into the opening and fills it closely with hard soap; this, in his judgment, excludes the air and kills the grub. Mr. Shaw feels confident that he finds two varieties of borers—one that girdles and one that penetrates.

The way canker-worms are dealt with is as follows: A pan is adjusted upon a long pole, in which brimstone and live coals are placed; the worms, coming within reach of this fumigation, are destroyed.

The Committee found the orchard of Mr. Shaw in a vigorous and thrifty condition; the fruit was abundant, large and fair; some of the trees, more particularly the Baldwins, were bending under the load of fruit. The pruning was not severe, only the interlacing branches being cut off. The trees occupied the whole ground, so as to render it difficult, in some cases, to pass around them. When ten years old these fifty trees yielded seventy-five barrels of fruit, and since that time they have never returned the owner a sum less than $150 annually, with the exception of last year. The Committee were unanimous in adjudging this a well-managed orchard, reflecting much credit upon the skill and industry of the enterprising owner.

The Committee, on invitation, next visited the orchard of Henry Comey, Esq. This contains about thirty-five trees, on one-third of an acre, standing twenty-two feet apart. Besides the common varieties, there are trees of the Gillyflower and Blue Pearmain, with beautiful and perfect fruit. This orchard is surrounded by a close fence, and is used as a hen-yard; by the activity of the hens the grass is kept down, and the ground kept open and mellow, and doubtless many grubs and insects injurious to the fruit are destroyed.

Mr. Comey has found great benefit from the moderate use of coal ashes as a top-dressing; finding the fruit of a certain tree larger and fairer than on other trees of the same variety, he attributed it to the coal ashes that happened to be deposited there. Following the hint, he spread these ashes thinly under other trees, and obtained fruit equally large and fair. From the known ingredients of these ashes we think the action in this case must have been chiefly mechanical. But such experiments are worth the trial.

The trees of Mr. Comey have been well cared for. The fruit is large, smooth and highly colored, and the product doubtless surpasses that of the same number of trees in the orchard of Mr. Shaw. The rules of the society, at the time of the visit, did not allow the Committee to award a premium to an orchard of less than fifty trees. Since that time the rule has been modified so as to embrace orchards of twenty-five trees; this will bring into competition a large number of orchards in the county which we hope may be entered for premium the coming year.

The Committee also visited the orchards of Messrs. A. R. Aldrich and C. W. Lane. These both range along with that of Mr. Comey. They have the same number of trees and the same conditions of soil and culture, and nearly the same varieties of fruit and the same fulness and excellency of products. In each of these orchards was found the very excellent arrangement of making the hens the cultivators of the soil and the destroyers of insects. The smooth and perfect fruit on all these trees of every variety bore testimony to the benefit of the humble cultivators.

Among the trees of L. Pond, Esq., the Committee saw in perfection Hunt's Russet, which is said to be a better bearer than the Roxbury Russet. It is very fair and handsome, will keep into April, and commands a great price in market. This variety is in high repute in Danvers and vicinity, and is being largely cultivated.

The cold grapery of George E. Leonard, Esq., and his apple orchard next received the attention of the Committee. The culture of the grape by Mr. Leonard seems to be a perfect success. He succeeds in obtaining an abundant crop and in ripening it so early as to secure the highest prices. His apple orchard presents the same appearance as the smaller ones already described.

The Committee append a few thoughts suggested by their observations at Foxborough and elsewhere, and by discussions arising among themselves.

Form of pruning.—In our climate the apple-tree should not be pruned in the saucer or wine-glass form. Such a form exposes the naked limbs and bark to the direct and severe rays of our bright and powerful sun. This form is well suited to a humid climate, where the sun is less powerful, and is for long periods shut out by clouds and fogs. The balloon or umbrella form is best suited to our locality. The branches should not materially cross or interlace, but while they exclude the direct and more powerful rays of the sun from the bark, they should be so thinned out as to admit its light and warmth to every part of the tree.

Time of Pruning.—Here opinions vary. We say, *between the fall of the leaf and its germination.* This is the time of leisure. It is the most favorable time to judge of the shape of the tree—to see just what needs to be removed. If necessary to cut off large branches, the scar should be covered with a solution of linseed oil and yellow ochre. This, without doing injury, will keep the wound fresh and prevent cracking, which is the only evil effect of winter pruning.

Scraping.—This should be done, if at all, gently, so as not to tear or bruise the bark. Many trees, of tender bark, like the Sweet Bough, Porter, &c., may be seriously injured by severe scraping. Follow nature as nearly as possible.

Washes.—Nothing should be used which tends to tighten or bind the bark. A solution of soft soap or whale-oil soap can do no harm.

Distance of Planting.—Thirty feet apart is the least distance for apple-trees ; then they will cover the whole ground. Forty feet is the common distance for orchards, and fifty feet if the land is to be used for grass or grain. In all the orchards examined at Foxborough the trees stand from twenty to twenty-five feet apart ; already, when but sixteen years old, they cover the whole ground and begin to stretch into each other.

Borers.—The gentlemen at Foxborough have generally adopted the plan of plugging the holes of the borer with pine plugs or with hard soap. Others have used successfully coal ashes heaped around the trunk of the tree, a few inches above the surface. The only safe course is the knife, the gouge and the wire; with these the tree can be kept clean, provided the borer works where it can be reached.

L. W. Babcock, Esq., of Milton, for many years has kept a large orchard free from the borer in the following manner: Learning that the borer enters the tree just at its junction with the soil, he raises the soil around the tree from four to six inches above the natural surface, and leaves it thus raised through the year. In June he removes the little mound from around the tree, and has all the work of the borer six inches above the ground, where he can easily work. With the knife and wire, guided by the exuding sap, the work of extermination is rapid and sure. After the operation, the soil is raised around the tree as before, and is left for the October work, when it is again removed, the examination made, and the soil returned. In this way, with perseverance, every orchard in the country can be saved from the ravages of the borer.

Varieties.—Success in the apple orchard depends in no small degree upon the variety chosen. In selecting the Baldwin, Greening and Russet, for New England, one cannot mistake; after this the way is not quite so clear.

A member of this Committee, Cheever Newell, Esq., of Dorchester, when sixty years of age, set out an orchard of forty trees, about twenty of the Williams and twenty of the Gravenstein. This autumn the fruit of the above orchard, now twenty years old, sold for about $500.

The Gravenstein begins to ripen early in September, and continues through October. The fruit should not be picked; it is in the best condition for market when it falls from the tree. The custom is to cover the ground with salt hay or litter to protect the fruit, and pick the apples from the ground as they fall from day to day. The duration of the fruit is thus prolonged for a period of ten weeks.

The Committee have the honor to present the following list for general cultivation, prepared for them by the President of the Norfolk Agricultural Society, Hon. Marshall P. Wilder:—

Summer.—Red Astrachan, August; Williams, August; Sweet Bough, August.

Autumn.—Gravenstein, September and November; Porter, September and October; Hubbardston Nonesuch, November and December.

Winter.—Baldwin, Rhode Island Greening, Roxbury Russet; Tompkins County King—fine, large, red winter, promises to be very valuable as a market fruit.

Sweet.—Lyman Sweet, large yellow, late autumn, into winter; Ladies' Sweet, keeping into June.

A. K. TEELE, *Chairman.*

MILTON, December 22, 1868.

HEDGES.

WORCESTER NORTH.

Statement of Charles Mason.

The live fence, or hedge, entered by me for a premium, in its whole length extends about sixty rods. About one-half of it is buckthorn, the rest three-thorned acacia, sometimes called honey-locust.

The experiment was made under considerable disadvantages. The ground, naturally not of the best in respect to the quality of the soil, had not been put into proper condition to insure the most successful result. The hedge was planted on the line of a public road, recently built, the grading of which required more or less cutting and filling; and to bring the hedge-bed to conform to the grade of the road it was necessary to raise or lower the ground in places, to suit the case. The consequence was a great diversity in the soil along the line, and this has occasioned a corresponding inequality in the growth of the plants.

The preparation, such as it was, consisted in ploughing up, the year previous, a narrow strip along where the hedge was to stand, and in digging, at the time of transplanting, a trench about a foot deep and two feet wide, which was filled up with such loam, but indifferent in quality, as could conveniently be obtained for the purpose; and in this the plants were set.

The buckthorn hedge was set out mostly in 1859, the residue in 1861. The plants were raised from seed sown by myself in 1858. When transplanted for the hedge they were set in two parallel rows, the rows being a foot apart, the plants sixteen inches apart in each row, a plant in one row being opposite the middle of the space between two plants in the opposite row. So far as my observation extends, this arrangement for the buckthorn, in respect to the location and distance apart of the plants, is satisfactory, and suited to produce a close, compact and effective hedge.

The plants when set were cut back to the length of three or four inches above the ground, and planted at about the same depth as they originally grew. If, as happened in very rare instances, a plant failed, another was substituted in its place as soon as the failure was apparent.

After the hedge was set out no special labor was bestowed upon it, except to keep it hoed and clear of weeds until the plants had come to occupy the ground; to enrich any spots where the soil was poorer, and the plants consequently weaker, so as to effect a more equal and even growth, and to trim the hedge. The trimming has consisted in cutting the shoots back, once in a year, commonly in the spring, rarely in the autumn, to within two, three or four inches of the last cutting. In this way the hedge has come forward but slowly—which I have regarded of less consequence than the securing eventually of a well-conditioned, effective barrier. I have allowed the plants the unbroken season's growth, under the idea of securing thereby a stronger growth of the roots, and have cut them back thus severely in order to get a thick and close screen at the bottom. I have designed to let the lateral shoots grow so as to make the hedge about two and a half or three feet wide on the ground, and to clip the twigs, on either side, from the bottom, on a curved line, to the ridge.

The acacia hedge was set out chiefly in 1863, the rest the succeeding year. The plants were raised from seed sown the year previous. This was set in a single line, the plants three feet apart in the row. I consider this sufficiently near for this kind of plant, as it is a strong and vigorous grower; and by the time the hedge has attained a sufficient growth to serve as a fence the lateral shoots in the line of the fence will have effectually closed up the openings between the plants.

This hedge has been treated much the same as the buckthorn. The growth of the acacias has not been as uniform and even as of the buckthorns. Besides the diversity properly due to the inequalities of the soil, some of the plants have seemed much less free in their starting and growth than others. Moreover, in some seasons certain of the plants have been injuriously affected by the cold of the winter or spring, the twigs having in some instances been killed back nearly to the bodies, thus requiring in those cases a fresh growth of shoots from the trunk, and putting them back a season behind their neighbors; and finally they have, in spots, been shaded to some extent by trees that have sprung up and been suffered to grow along the roadside, and thereby their growth has been retarded in those places.

As the result of my limited experience and observation, I apprehend it is practicable to grow a hedge which will make a good and serviceable fence, with either of the plants in question. The buckthorn is more slender in its growth. It has, properly speaking, no *thorns;* but in its more advanced age it puts forth hard, stiff *spines*, which, standing out in a thick-bottom growth, are calculated to deter any animal from attempting to pass through the hedge. It has the advantage of being, so far as I have observed, perfectly hardy.

The sharp, strong thorns of the acacia—one main thorn and two opposite laterals—render a hedge of this plant, when of suitable growth for a fence, a truly formidable barrier; and though the acacia cannot be considered as entirely hardy, it is so far hardy that, with proper care in starting the hedge, it may be made to answer the purpose effectually. To this end a liberal reserve of plants should be kept growing and cut back in like manner with those standing in the hedge, so that when one of these, for any cause, drops out or falls greatly behind its neighbors its place may be supplied with one of those of equal age and growth with the body of the hedge, which have been thus reserved and trained.

As to the time required to rear a hedge to be adequate to serve as a fence, the books speak of three or four years as sufficient. That may be so in the rich soil of the West, with the

Osage Orange, or Maclura, a far more rapid and vigorous grower, but which, according to the prevailing impression, is not sufficiently hardy to be relied upon for this climate; but with the buckthorn, or the acacia, which is of somewhat more rapid growth, it would be idle to expect, in any average soil, to effect this result in less than six or eight years at the least.

Whoever wishes to make a trial of raising a hedge can readily do it. The plants of either of these two kinds are raised from the seed with great facility. The seed should be sown in well-prepared soil, in drills or rows, two feet apart or thereabouts, and the plants thinned out in the row, so as to allow each plant left a fair opportunity for a start. If carefully cultivated through the season the plants will be suitable to transfer to the hedge-row the next spring. When set out it is desirable that they be as nearly as possible of uniform size and strength, and be all good, strong, vigorous plants.

The bed in which the hedge-row is to stand should of course be suitably prepared in advance. For this purpose a strip of ground, at least eight or ten feet in width, should be ploughed to a liberal depth, and, unless the soil is particularly good, generously enriched; and this cultivation and preparation should be continued until the soil has become well mellowed and enriched, and, as nearly as may be, of uniform quality and condition along the whole line; and when the plants are to be set, a bed, say three feet in width, should be spaded or otherwise thoroughly mellowed up, along where they are to stand.

CHARLES MASON.

FOREST TREES.

From the Report of the Committee.

There was but one entry for the premiums offered. That was by W. B. Hosmer, of Leominster.

Your Committee examined the grove of Mr. Hosmer, and were pleased with the thrifty appearance of the pines he had raised. Those that were transplanted were the most uniform in size and distance. Your Committee think Mr. Hosmer made a mistake by setting his trees so far apart, allowing them to grow bushy, and then trimming them. We think a white pine should not have live limbs trimmed from it, as this causes the tree to bleed, and that makes a black spot in the lumber.

Statement of W. B. Hosmer.

The lot of forest trees that I enter for premium contains some over one acre, and is planted with white pine. I commenced, May 16, 1857, by sowing the seed and transplanting about one-half of the lot in rows. I found it much the cheapest and surest to transplant the small pines rather than to sow the seed. In 1861 I set out the remainder of the lot the first of June. The land on which I have planted is good plain land. My method of planting is to take up the small pines with some soil; the roots being numerous it will easily remain. In setting them out it requires but little care or skill, as they are most certain to live. After experimenting on the trimming of the pine, I have come to the conclusion that it is important to trim; think they make better growth than to leave the limbs to die out as they always do. I know most persons think it will not do to trim, and have heard it remarked that it would kill trees. The committee can judge whether they think any injury resulted from the trimming of mine. In trimming, it will not do to cut the limbs off close to the body, but some three inches from it. The trimming should be done in the winter, when the limbs are frozen, and never at any time should a tree be trimmed so that the remaining limbs will not shade the trunk of the tree. It is evident to me that the rays of the sun falling directly on the trunk of the tree is what causes it to die, and not the cutting off the limbs. I am satisfied that a source of great profit can be realized from the planting of pines, and if the many acres of waste land we now see were converted into a growth of pines it would be a profitable investment.

WM. WOODBURY, *Chairman.*

CRANBERRY MEADOWS.

MARSHFIELD.

From the Report of the Committee.

Many of the swamps of Massachusetts are well adapted to the cultivation of cranberries, which constitute both a luxury and a wholesome diet. Nearly all persons purchase more or less of them, since they have ascertained their beneficial effects. We believe the demand will increase so as to keep pace with the supply, even if we raise as many as we can on our swamp lands and bogs.

It is important that the nature of soils in which the cranberry will most easily grow should be considered by those who turn their attention to its culture. We would recommend peat bottom,* as peat, fine sand, water and air are the most important elements the cranberry feeds upon. Fine sand stands first for a top-dressing; it partly subdues the wild grass, and a heavy dressing, say four inches deep, will ward off white frost.

In making experiments, the best and richest soils are generally selected; hence the failures. If the vines are planted in good, rich soil, they will do well, apparently, but will not bear fruit. Manuring is wholly out of the question. Clay and marl are totally unfit for the cranberry cultivation.

It is possible that the cranberry cultivator may select good soil, plant vines, and fail. If the healthy vine is not chosen, the result will be a failure. It is necessary that the inexperienced should have some knowledge of the vines he is about to purchase. The healthy vine (in speaking of the healthy vine we mean that which is the most fruitful,) presents an appearance of greenish brown on the leaf, the spears and runners are fine, thin and wiry. They seem of stunted growth. The unhealthy (barren vine) appears much brighter and stronger; hence many are apt to be deceived.

A surer way of selecting good vines is, when the fruit is nearly ripe go to the meadow where the vines are for sale and see how they bear. If they bear well, you may be certain that the vines are healthy.

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* Notwithstanding the good development of the cranberry vine when set into peat bottom, it should not be planted until the peat has been exposed to the frost and air one year.

The best time for planting is either in the spring or fall of the year. Vines may be taken up in the fall and left in a moist cellar until spring, and when planted will take root and do well.

There are various methods of planting; one of the best is the separation of sod vines. On obtaining a sod on which the vine is growing, examine it closely, then place your fingers among the roots and tear them out carefully. Separate the vine into as many as you can conveniently, leaving two or three small spears or runners on the roots. Set them in hills eighteen inches apart, and place the roots in the soil first; then spread out the spears or runners, and bury them in the soil, leaving out of the earth the tips of the spears or runners.

When the vines are planted their development depends on the treatment they receive. If they are neglected, grass and weeds will spring up, and it will be impossible for them to be very thrifty. They should be hoed until the runners begin to spread over the intervals between the hills, after which the grass and weeds should be pulled up.

Generally, after the second or third year the vines will take care of themselves. It is better to flood the vines in the winter or spring, and the water should not be drawn off until the middle or the last of May. The cultivators begin to pick the fruit and get it ready for market about the middle or last of September.

There are two methods of picking; one is by hand and the other by raking. Picking by hand is much the best way, as raking cannot be done in meadows where the vines become matted, without doing them a serious injury.

There are several kinds of this fruit. The bugle cranberry is of a pale color, and is not valued so highly as the bell or cherry, which is round and large, and its color is very dark when it is properly cultivated. One of your Committee has on his meadow a species of white cranberry. It does not turn dark by keeping, but always remains white.

The packing of the berries is of importance. It is usual to spread them out, so that all the moisture may evaporate; then they are winnowed, picked over, and, if the market is not far distant, they are packed in dry barrels, and thus sent there.

We hope the time will come when cranberry growing will receive the attention it deserves, as we consider it an important branch of cultivation.

ISRAEL H. SHERMAN, *Chairman.*

SCITUATE, October 1, 1868.

GRAIN CROPS.

MIDDLESEX SOUTH.

Statement of Henry Bright, Jr., of South Framingham.

INDIAN CORN.

Four and a half acres entered for premium.

1867.	EXPENSES.	
Nov. 30.	Ploughing,	$20 00
	118 one-horse loads manure,	118 00
1868.		
May 5–29.	Planting,	53 00
June 13–17.	First hoeing,	18 00
July 7–16.	Second hoeing,	17 50
Sept. 9–19.	Topping stalks,	21 00
Oct. 14.	Cutting up and housing corn,	11 25
	Husking 485 baskets corn, at 5 cents,	24 25
		$283 00
	Half value of manure to be deducted,	59 00
		$224 00

PRODUCT.

Mr. Charles Frost, surveyor, measured the land, and found it to be but four and a half acres, planted to corn. The total yield of this was 585 baskets, viz.: 467 baskets sound ear corn, weighing 45 pounds to basket, and 18 baskets pig corn; or

467	baskets corn, worth 85 cents per bundle,	$396 15
18	baskets pig corn, worth 25 cents per basket,	4 50
1,030	bundles of tops, at 2 cents per basket,	20 60
4½	tons husks and buts, $8,	36 00
	Total product,	$458 25

Total expense, ...	$224 00	
Profit, ...	234 25	
		$458 25

Remarks.—In deducting half the cost of the manure, I have followed other agricultural reports; but even allowing the whole cost of manure, I am satisfied my corn crop paid me as well as any other crop would, although many think it is unprofitable to raise corn in New England. The fodder I have priced lower than I can purchase it, and the weight of it I have had to estimate.

WORCESTER NORTH.

Indian Corn.—The field entered by Solon Carter,* of Leominster, had twenty-two hills per square rod—3,520 hills per acre; weight of shelled corn per square rod, $41\frac{1}{2}$ pounds—$118\frac{4}{7}$ bushels per acre, the greatest yield ever reported to this society. Weight of cob to the square rod, $6\frac{1}{2}$ pounds.

The field entered by Joseph Goodrich,* Lunenburg, numbered $28\frac{1}{2}$ hills per square rod—4,560 hills per square acre. Weight of shelled corn to the rod, December 1, 33 pounds—$94\frac{2}{7}$ bushels per acre. Weight of cob per square rod, five pounds.

The field entered by J. P. Reed, Princeton, numbered twenty-six hills per square rod—4,160 hills per acre. Weight shelled corn per square rod, 31 pounds—$88\frac{4}{7}$ bushels per acre. Weight of cob to the square rod, $4\frac{3}{4}$ pounds.

Two other fields were entered, each comparing favorably with the last mentioned, and highly creditable to the proprietors for the farm-like manner of cultivation, proving that weeds were not allowed to grow, or had been taken up and removed previous to gathering the crops, all of which is very essential not only for the present crop, but for those that follow.

Much has been said of late in regard to growing grain in New England. It is maintained by some that the grain crop should be in the main discarded, and that we depend upon the West for our corn and flour. Evidently this depends upon circumstances. In Worcester North we have a great variety of soils; some farms are well adapted to growing hay, others to vegetables, grain and fruit. Doubtless the man that is in possession of a good grass and grazing farm has the most profitable farm in this section, because with it and from it he can get the greatest amount of crops with the least labor, the latter of which is a matter worthy of consideration.

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* The statements of these competitors are not sufficiently definite to be of any general value, the amount of manure used not being given. The term "loads" means a very different thing in different parts of the State.

It is folly for one man to undertake to do everything, and it is the height of folly for a man to pursue that kind of farming he has no taste or desire for. Simply because Mr. A. or Col. B. has become wealthy by stock-growing, it is no criterion that Mr. C. can gain a fortune in the same business, unless he is particularly interested in that kind of farming.

If a man is interested in stock-growing, then that is the kind of farm-work for him to pursue ; if he has an interest in market gardening, and is in the immediate vicinity of a market, he will doubtless gain a livelihood by that branch of agriculture ; if he has a desire for fruit-growing, he should enter into it with his whole mind and heart. In either or all of these pursuits he must have both mind and hands engaged in the work. Now we suggest to every young man who has made up his mind to become a farmer, to determine in the first place what branch of farming, as there are many, he will pursue. Ponder this subject well beforehand, and then purchase the farm best adapted to his wants and circumstances. It appears from the competitors' statements that the corn crop the past year with them has been somewhat profitable. Yet it is questioned whether, as a general thing, growing corn, at the present high prices of labor, can be made as profitable as some other crops. It is noticed, by their statements, that they use from twenty-eight to thirty loads of manure, besides in many cases some kinds of fertilizers ; and it is generally supposed that one-half the value of the manure and the whole of the fertilizers are consumed by the crop, as the roots of the plant completely cover the ground and also extend several feet instead of only a few inches, as was formerly supposed.

At the time one of these fields was gathered, the weight of corn and cob was about four tons, and the weight of stover must have been two or three times as much, making some twelve or fourteen tons per acre. This, of course, must call heavily upon the manures and soil.

Hence, it is suggested that a more economical operation would be to plough our grass fields after being cropped eight or ten years, spread compost manure, and seed down with winter wheat the last of August or first of September; and in the majority of cases the wheat crop is of as much value as the corn, with three-fourths the labor and three-fourths the value of manure. Aside from this, another gain is made by having the field out of grass one year only instead of two.

It is the experience of the writer of these remarks, who has grown fields of wheat nearly every year for the last thirty, that when sown at this season and in this way, it is more sure than at any other season or of any other preparation of the soil.

The compost manure, being near the surface, affords an excellent pasture ground for the seed to germinate before the "setting in of winter;" and in case the ground heaves with frost in winter or spring, the whole sod is moved; consequently the roots of the plant are not disturbed very materially by the action, and as soon as the ground begins to vegetate in spring the wheat roots find another rich feeding ground in the decayed grass turned under the autumn previous, all of which serves to hasten the crop and have it ready for an early harvest. Fields managed in this way have been ready to cut the 12th of July, thereby escaping both weevil and blight.

Night soil is an excellent manure and fertilizer for wheat. In September last a part of a field of wheat was manured with night soil mixed with peat; that part of the field thus treated has now (December 1,) the appearance of being, to say the least, equal to any part of the field. Now if every farmer would save the waste, by being at the expense of making tight vaults and using peat, a sufficient quantity of manure or fertilizing substance might be made each year for at least from one-half to an acre of wheat or some other crop.

Salt is a fertilizer for wheat and rye. Although a member of this Committee has used salt for potatoes without any good results, but rather an injury, yet we find the following article in the "Country Gentleman," by a Michigan farmer. He says: "In 1865 I sowed about eleven acres of wheat which had been entirely impoverished, consisting mostly of light sandy soil, with rye, two bushels of seed per acre. The field had been in white beans the year before, and had not returned the cost of the seed and labor. For the rye it was ploughed in July, and buckwheat sown, which was turned over when in blossom and rolled down. The rye was sown broadcast in October, and, after harrowing, ten bushels refuse salt was sown over the field, (eleven acres.) The result was in some respects extraordinary. Before germination, a tremendous gale, lasting through several days, carried volumes of sand off the field, reminding one of the simoons of Sahara. The following winter was open, without snow sufficient to cover the rye. During the succeeding summer and fall several severe gales prostrated the corn in the neighboring fields, but did no injury to this rye, which was of very rank growth and attained an unusual height, yielding thirty bushels per acre. The rye crop in my vicinity was almost a total failure. In the spring of 1866 clover was sown by a machine on the young rye, and produced as even a lay and good yield as could be desired. My deductions from this experiment are that the salt gave increased growth and stoutness of straw and an increase of yield and plumpness of berry, fully confirming, to my mind, the soundness of our revered friend John Johnston's views on the use of salt as a fertilizer for wheat and rye."

Throughout the northern part of Worcester County we find any amount of dry, sandy, spongy soils, such as are surface dry in a few hours after a heavy rain—consequently produce only meagre crops, or no crops at all, unless the season proves wet. On such soils, in quite dry seasons, an extra layer of manure seems to be lost; it dries up and is taken into the atmosphere.

When lands are too wet and retain surface water, the remedy is either surface or thorough drainage. It is expensive but effectual in the end. Now what can be done to improve those soils where crops entirely dry up? In wet summers soils of this character are quite productive if well manured. It is plain if we could add something to them to retain the moisture of the dews and gentle rains, we might get very fair crops from them even in dry seasons. The reason that dry lands require so much more manure than loamy soils, is that the rains wash all the fertilizing properties of the manures through the porous soil and out of reach of vegetation, and from the porosity of the soil the air has too great access, so that vegetation decays rapidly and the ammonia is carried off into the atmosphere and is nearly all lost to the crop.

Now what is the remedy?

Meadow muck or peat is generally most accessible, and comes within the reach of most farms. It is well known that when peat has been thrown into piles to season, for months after it is still wet, it absorbs moisture from the atmosphere and retains it similar to that of a sponge, and will hold from fifty to one hundred per cent. of its own weight of water, according to its porosity. Nor does it part with it very rapidly; it dries almost as slowly as clay. Now, if twenty loads of muck to the acre be spread and ploughed in for three successive years it will make about one inch more of soil and a sufficient quantity for the purpose of retaining the moisture and preventing the escape of ammonia. Soils of this character, and thus treated, as they are easily cultivated, would probably pay a better per cent. in some hoed crop than to remain in pasture and get no return from them except wiry grass, hard-hack and mullein.

It is well known to farmers generally that light, sandy soils are subject to frequent and rapid changes of temperature; that is, they follow the changes of the atmosphere from hot to cold and from cold to hot. In a hot summer's day they are hardly endurable to the touch, yet on these soils the frost makes its first appearance. If to soils thus subject to quick changes a heavy dressing of meadow-muck be applied, they will not, on the one hand, become so warm in a hot day, nor on the other cool so rapidly nor so much in the night. The temperature becomes more even, and consequently more conducive to vegetation. This regulating power is due in a measure to the stores of water held by the peat. In a hot day this water is constantly evaporating, causing a cooling process. At night, the peat absorbs moisture from the air and condenses it in its pores, producing an accumulation of heat. It is the opinion of those that have used peat, that twenty loads of it, with one load of leached ashes and one load of yard manure, are of more value than the same amount of barn manure; and one part of Pacific guano, mixed with eight or ten of peat, is an excellent fertilizer, if placed in the hill, for beans or potatoes. If our vaults, pig-pens, hen-roosts and horse-stables were constantly deodorized with peat it would add greatly to our manure heaps and well pay the expense.

Will some of our young farmers or farmers' boys look to this and try it on a small scale?

The above are abstracts from Prof. Johnson's Peat-Book, as nearly as can be remembered, and put in practice by the writer and others.

Hence the remedy for dry, sandy soils is the use of peat, and for our wet, heavy soils, or those that retain water, field drainage, as the roots of all field-plants have a great aversion to stagnant water. Says the author of a work on farm drainage, "The roots of plants will go anywhere rather than into stagnant water; but remove the water by drains and the soil becomes sweeter and more friable, affording ample means for the roots to extend their researches, thus giving vigor, health and strength to the plant."

EPH'M GRAHAM,
For the Committee.

BRISTOL.

Statement of Rotheus H. Reed.

INDIAN CORN.—The crop in 1866 was hay. No manure was used. In 1867 it was planted to corn. I used fifteen loads of barnyard manure, of thirty bushels to a load. The soil was a sandy loam—ploughed but once and harrowed. Cost of ploughing and other preparation, $4.50. I used nineteen loads of manure, of thirty bushels to a load. It was spread and ploughed in. I also used one barrel of superphosphate of lime;—put a large spoonful in a hill, covered it with loam and dropped the corn on it. Value of manure on the ground, $42. One barrel of phosphate, $7.80. Planted May 29, in rows three and a half feet by two feet between the hills. Amount of seed used, ten quarts yellow corn. Cost of seed and planting, $4. Ploughed and hoed twice, cost $5. Harvested about the last of October, at a cost of $8. Amount of stalks and husks, $20.

ROTHEUS H. REED, *Easton.*

From actual measurement, I hereby certify that the land which the above crop of corn covered contained 160 rods, and no more. ANDREW HALL, *Acting Surveyor.*

I hereby certify that I, appointed for that purpose, ascertained the weight of the above crop, according to the regulations of the

State Board of Agriculture, on the 1st day of December, and that it was 5,640 pounds of shelled corn.

ANDREW H. HALL.

PLYMOUTH.

Statement of Albert Thomas.

INDIAN CORN.—The land on which my corn grew contained 171 rods, and is a sandy loam. In grass, without manure, in 1865 and 1866; forty-five loads of barnyard manure, of thirty bushels each, ploughed in seven inches deep May 5; the ground harrowed and furrowed. Planted May 15 with one peck of Whitman corn, putting in the hill a handful of hen-manure and ashes mixed; cultivated both ways twice, and hoed twice; harvested October 15. At the time of harvesting, the corn on the cob weighed 52 pounds to the basketful, the basket being filled 164 times, making in all 8,528 pounds, which, at 85 pounds to the bushel, (the old rule for weight at harvest time,) gave $100\frac{28}{85}$ bushels, being at the rate of $93\frac{15}{17}$ bushels per acre, very nearly. An average basketful kept till December 2, and shelled, gave 38 pounds of corn and 6 pounds of cob, making 6,232 pounds of corn, which, at 56 pounds to the bushel, equals $111\frac{16}{56}$ bushels, being about 104 bushels per acre; and $2\frac{1}{2}$ tons of stover, worth $25.

EXPENSES.

Ploughing, &c.,	$8 00
Manure,	55 00
Seed and planting,	3 50
Cultivation,	8 00
Harvesting,	5 00
Total,	$79 50

SUMMARY.

$100\frac{28}{85}$ bushels of corn, at $1.50,	$150 49
$2\frac{1}{2}$ tons of stover, at $10.00,	25 00
	$175 49
Expenses, as above,	79 50
Profit,	$95 99

Mr. Thomas, as will be seen by the foregoing statement, reaches a result similar to that reported by him last year, viz., a considerably larger yield when determined by the weight of the merchantable crop, December 1, as required by the regulations of the State Board, than when computed at 85 pounds of ears to the bushel at harvest time. Either result is but an approximation to the true yield, as the shrinkage of corn continues long after December 1st of the year in which it is raised.

While all farmers admit that the corn crop needs at some period of its growth some slight connection with the ground, there are many who hasten to sever that connection at the earliest practicable moment, and who claim that their corn is benefited by the process. It may be and doubtless is true that in some seasons an immature crop in the shock is preferable to a frozen one in the field; and on this ground killing the plant to save its life may be advisable. It may in some cases be good husbandry to increase the fodder in the barn at the expense of the corn in the crib. But when, for these or other reasons, the plant is killed or mutilated before arriving at maturity, it cannot be expected to produce grain as sound and heavy as when each of its organs continues to perform its appropriate function in the economy of growth, till nature, having no further use for it, suffers it to pass gradually into the "sere and yellow leaf" or the withered and sapless stalk.

Statement of Albert Thomas.

OATS.—The land on which my oats grew was a sandy loam, and measured 162 square rods. In potatoes in 1866, manured with thirty-three loads, of thirty bushels each, of barnyard manure; in turnips in 1867, with the same kind and quantity of manure; ploughed twice eight inches deep in April, 1868; three bushels of seed sown April 15, without manure; cradled July 27. Product, 1,448 pounds, or 45¼ bushels of oats and 1½ tons of straw.

EXPENSES.

Ploughing,	$6 00
Seed,	3 00
Sowing,	2 00
Harvesting,	6 00
Total,	$17 00

My crop was not as good this year as usual, the season having been very wet, and the oats injured as the result.

ROOT CROPS.

MIDDLESEX NORTH.

From the Report of the Committee.

Since so much of the pleasure of the table and the strength of the body are derived from the variety and qualities of vegetables daily consumed, it is natural that the vegetable department of our exhibition should attract and receive a large share of the attention of contributors and visitors at our agricultural exhibitions. With the increased and improved varieties of vegetables now cultivated, and the high prices of meat, the former have come to stand second only to the "staff of life" among the necessities of our table supplies. Nor is the demand increased for table consumption alone. No good farmer can feel that he has had a successful and satisfactory harvest unless he has laid by in store a good supply of vegetables for the use of his stock during the long New England winter. He knows how much of the thrift and profit of his winter dairy depends upon his well-filled vegetable cellar; and in no other way can he so cheaply increase these, while the eager welcome which his cattle give him as he daily presents himself before them with well-filled baskets for their use, will afford him much cheaply-purchased pleasure.

With all our increased attention to this branch of culture in New England, we are yet far behind old England in this line, where the root crop is an indispensable requisite, and is considered as one of the most profitable of agricultural products, not only for the dairy, but for fattening for the shambles.

Your Committee think that many of our farmers will find their profits increased if they will appropriate a larger portion of their soil to the growth of such vegetables as will much diminish the amount of hay and grain requisite for winter use. The amount of labor, if properly applied, will be comparatively small, while the increase of profit will be very great.

Since so much of pleasure and profit are connected with this branch of horticulture and agriculture, he is certainly a benefactor of his race who furnishes us with improved varieties of vegetables, or tells us how the quantity of their products may be increased. Much has been accomplished in this direction. The tomato has become almost indispensable. The marrow, Hubbard, custard and turban squashes have almost superseded the old-fashioned crookneck for table use. A variety, new to your Committee, the "Yokohama," was offered this year by Mr. George F. Gilson, of Dunstable, which, as far as solidity and weight are concerned, promises to be a valuable accession to our winter varieties. But as "the proof of the pudding is in the eating," your Committee have had no "proof" of the excellence of this squash.

With the reappearance of the "potato rot" among us, the attention of farmers will be more directed to such varieties as are least subject to this pest. Many new varieties have been recently introduced, some of which have been regarded as valuable accessions to our table supplies. If these shall withstand the rot, they will take the place of some of the older varieties. Mr. Lorenzo Phelps gave a statement of his manner of seeding and the results of the different methods. Others have obtained as good results, but have not told us their methods of procedure. Mr. Phelps' statement is as follows:—

Weight of seeds, ...	2	pounds.
Number of tubers, ...	5	
One potato, cut in four parts, planted May 25, produced	20	pounds.
One, cut in eight pieces, produced	41	"
Three, cut in single eyes, produced	120	"
Total product of two pounds, five tubers, .	181	"

N. B. Edwards, *Chairman.*

MARSHFIELD.

From the Report of the Committee.

TURNIPS.

Your Committee, after measuring the field, selected one square rod, which we thought would be a fair specimen of the whole field; pulled, topped, trimmed and weighed, finding 278 pounds to the square rod, making 370⅔ bushels on the half acre, and being at the rate of 741⅓ bushels per acre.

Statement of Ichabod Chandler.

Crop of 1866, grass, no manure. Crop of 1867, millet. Ploughed June 15, without manure; soil a sandy loam; harvest, about half a crop of millet. 1868, May 15, applied eight cords of green manure, made from cows and horses, worth $4 per cord, making a value of manure of $32. Hauling the same, $3.50; ploughing, May 18, $2.50; harrowing, May 18 and 27, $1; June 8 and 19, $1.25; planting by hand, June 20, $3. As soon as up, hoed with shuffle-hoe, $3. Ten days' later, hoed with common hoe, $6; thinning and transplanting, $3; harvesting, $18. Planted in rows eighteen inches apart, distance in rows about one foot. Thus making the whole expense on field $73.25, or nearly nineteen cents per bushel.

JOHN H. BOURNE, *Chairman.*

DOMESTIC WINES.

HAMPSHIRE.

From the Report of the Committee.

Wine—what is it, and of what elements is it composed? Wine, in the common acceptation of the term, is the fermented juice of the grape. Its final elements consist of water, alcohol, and a small percentage of acid, and an odoriferous principle, or aroma, also, unfermented sugar, a coloring principle, and sometimes a proportion of tannin. Foreign wines, when they reach us free from adulteration, are the purest and best. But we seldom obtain them in a pure state. Going through the hands of the producer, the importer, and the wholesale and retail dealers, by the time they reach the consumer they are usually anything but pure wines. Hence it becomes us, if we can do so, to manufacture our own wines, if we desire a pure article. This can readily be done, not only from our own native grapes, but from a great variety of fruits and berries indigenous to our own country. And an article can thus be produced nearly, if not quite, equal to the best imported wines, and far superior to the adulterated article as we commonly receive it.

Several original elements are necessary in order to produce a sound, wholesome and good wine. These substances are sugar, water, tartaric acid and mucilage. Besides these, there are other substances, not positively necessary, but usually existing in the juice of grapes, which give the wine its color and flavor, such as gluten, potash, tannin, aroma, malic acid and a coloring principle. Perfect wine cannot be made without the presence, in considerably definite proportions, of the four first-named articles. If the must, let it be the juice of grapes or any other fruit, is deficient in one of these substances, it must be supplied, or good wine cannot be made. If any one of them is in excess, it must be reduced or neutralized. Foreign grapes, all of which are varieties of a single genus, or species, contain the wine-making principles or ingredients in just about the right proportions. Some varieties contain more sugar and some more acid than others; but the variation from the proper quantities of each is so little that it is very seldom that any additions have to be made. The juice of the grapes is expressed and manufactured into wine at once. In our own country the juices of all our native grapes are deficient in sugar and have an excess of acid, hence it becomes necessary to dilute the acid principle by adding water and to supply the saccharine principle by adding sugar. A perfect must should contain about seventy-five parts of water, twenty parts of sugar and five parts of acid, mucilage, coloring matter, &c. Only about six one-thousandth of one part in a hundred are acid.

FOREIGN GRAPES AND FOREIGN WINE.

There are a multitude of varieties of foreign grapes, from which are manufactured all those choice wines, Port, Madeira, Rhenish, Moselle, Champagne, &c., that come to us the purest and best foreign wines. But they are all the offspring of a single species of the grape-plant, the *Vitis Vitifera*, of Linnæus. From this single species are derived all the varieties of cultivated foreign grapes of whatever name. And there is a striking similarity in the natural elements of the fruit, or the wine-making principle. They exist in each variety, with so little variation in quantity that very seldom anything foreign has to be added. In this consists the difference between them and our own native grapes, which are deficient in sugar and also contain an excess of acid.

It will at once be perceived that our neighbors over the water have every advantage over us, in the production of wine, both as regards cost and quality.

AMERICAN GRAPES.

All attempts to cultivate the foreign grape in this country with *profit* and *success* have been nearly, if not entirely, failures. Our climate is not adapted to their healthful growth and fruitage. By the means of hot-houses, and the forcing process and careful culture, foreign grapes have been produced; but the experiment has been laborious, and has not paid. We must depend upon our own native grapes, both for fruit and for wine. All our wild and cultivated grapes have sprung from four or five distinct species. Of the wild and cultivated grapes there are nearly two hundred varieties. Upwards of one hundred varieties are cultivated. From the following species have sprung nearly all the varieties of both wild and cultivated grapes: First, *Vitis Labrusca*, of Linnæus. From this species are derived the Isabella, Catawba, Concord, Diana, Rebecca, Anna, Hartford Prolific, Muscadine, Sweet-Water, &c. Nearly forty varieties of cultivated grapes have been produced from this species. Second, *Vitis Æstivalis*, of Michaux. The following varieties are descended from this species, and nearly twenty other species not named—Warren, Clinton, Burgundy, Delaware, King, and Nortons Virginia. Third, *Vitis Cordifolia*, of Michaux, commonly called the frost or winter grape. There are not more than one or two varieties of this species under cultivation, and these are of very little consequence. Fourth, *Vitis Vulkina*, of Linnæus. I believe there is only one variety of this kind cultivated, viz., the Scuppornong, named from a lake in North Carolina, on the banks of which it was discovered. There are one or two more species known to exist, but are not much known. In fact it is quite probable that all these rather unimportant plants, if properly analyzed, would be found to belong to one of the four first-named species. It is nearly certain, then, that all our grapes, wild and cultivated, can be reduced to four or five species.

MORE IN REGARD TO THE ELEMENTS OF WINE AND WINE-MAKING.

Let it be observed, that I have stated a general principle to be always heeded in making all kinds of wines, whether from the juices of the different varieties of grapes or fruits, viz., Four positive elements must be present in order to make good wine—*water*, *sugar*, *mucilage* and *acid*. These must exist in pretty nearly definite proportions, say from twenty to twenty-five parts of sugar, seventy-five parts of water, and five parts of acid, mucilage, &c. Our native grapes, both wild and cultivated, contain a small amount of sugar, (wild grapes the least,) and they also contain an excess of acid, (wild grapes the most.) Producers of wine must study the character of the variety of grapes they use in the manufacture of wine. The juice of wild grapes must be largely diluted with water, and treated to a considerable addition of sugar, nearly equal to one hundred per cent. of the former, and from twenty to twenty-five per cent. of the latter. It will be necessary to add more or less water to a certain amount of grape juice, according to the amount of acid they must contain.

I have stated that other ingredients enter into the composition of wine. I may as well speak of them here, before giving the best methods of making wine in detail. First, a coloring principle. This exists in the skins or peelings of grapes. White wines are made by expressing the juice of grapes and immediately putting it on ferment, without allowing it to stand and digest the skins, and thereby absorb the coloring principle. The opposite course is taken in the manufacture of all colored wines. The pomace is allowed to stand until the rich colors, purple and claret, contained in the grape-skins, are thoroughly extracted and incorporated with the juice. So also, in the second place, the odoriferous principle, or aroma, also contained in the skins of grapes, is extracted in the same way by allowing the skins to infuse for a season in the must before it is expressed from the pomace. Third, tannin, or the astringent tonic principle. This is contained in the stems and seeds of grapes. It is that which gives to Port and some other foreign wines their peculiar astringent taste and renders them valuable as medicines. This principle is imparted to wine by bruising or grinding the stems and seeds of grapes, and allowing them to steep in the grape juice.

A FEW SUGGESTIVE FACTS OR RULES TO BE REGARDED IN THE MANUFACTURE OF WINES.

I do not propose to give here the methods of manufacture of foreign wines; it would occupy too much space. Those who feel interested in such a history will do well to consult the excellent treatise of Gall. But I will state a few rules that it will be well for all wine-makers to heed. 1. Make wine from only thoroughly ripened grapes. 2. Obtain, if possible, the sweetest varieties; it will save the amount of sugar necessary to be added. 3. Gather the fruit in dry weather. 4. Avoid all imperfect fruit, such as that which is unripe, not well developed or worm-eaten. 5. Have all the utensils used in the manufacture of wine perfectly clean; also the casks, jars or jugs in which it is put to ferment. 6. In gathering grapes, do not pull off the clusters, but cut them off with a knife or pair of scissors. Pulling them off may break or injure the vines. 7. In the supply of saccharine matter, use only refined sugars. 8. In fermenting wine, preserve an uniform temperature; say from sixty-seven to seventy-five degrees Fahrenheit, is the proper grade best adapted for that purpose.

WHAT ARE OUR RESOURCES FOR WINE-MAKING?

In addition to a great many varieties of cultivated grapes, we have wild grapes in abundance, growing in nearly every part of the State, except in the extreme northern sections. In many towns they can be gathered late in autumn, fully ripe, by the bushel, just for the labor of plucking them. The material for grape wine, then, is in the reach of nearly all. Next in importance, perhaps, is the common garden red currant. This fruit, properly treated, produces a rich and delicious wine, hardly inferior to port or sherry. The common field or high blackberry also makes a cheap and pleasant wine, highly valuable as a medicinal agent, and also a delicious beverage. The juice of the apple, or common cider, can be manufactured into good wine. Peaches are also used in the production of a very delicate and pleasant wine. And then there are the berries of the sweet elder, (*Sambucus Canadensis*,) produced in great quantities in most parts of the State, from which not only a palatable but highly medicinal wine is manufactured. Raspberries, strawberries and whortleberries are also used in the manufacture of vinous drinks by no means to be despised. Even the gooseberry and black currant are numbered in the catalogue of our wine-making fruits. And I must not forget the wine-plant, a variety of rhubarb, now considerably cultivated for the purpose of making wine. Why need we use the foreign adulterated articles when we can make so many kinds of excellent native or domestic wines?

HOW TO MAKE THE BEST GRAPE WINE EITHER FROM CULTIVATED OR WILD GRAPES.

Collect the grapes when fully ripe, and free them from all foreign substances. Use nothing but sound grapes. They should be allowed to stand a few days after gathering to soften and sweat. They should now be crushed, in a clean cedar vat or tub, or in a large earthen jar. For making small quantities they can be crushed with the hands or with a wooden pestle or roller. Where a large quantity is to be made they should be crushed in a mill made for the purpose. After being reduced to a pulp or to pomace there should be added one gallon of pure soft water to every gallon of pulp for wild grapes, and for cultivated grapes, which are sweeter, not more than one-half or two-thirds of this quantity, according to their acidity. This mixture should be allowed to stand for two or three days, that the coloring matter of the skins and the aroma may become extracted and mingled with the must, or until fermentation begins to take place. Now the pomace should be carefully pressed or strained, and all the juice extracted and immediately put into clean casks or jugs. If into casks, they should be previously fumigated, if ever used before, with burning sulphur vapor. To every gallon of juice thus extracted, add three pounds of refined sugar and mix thoroughly. See that the cask, jug or jar is entirely full. Let the wine ferment in a temperature of about seventy-five degrees Fahrenheit. In about six weeks draw off the wine, cleanse the receptacle and return it. In six months, at most, it will be ready for bottling.

BLACKBERRY WINE.

Gather ripe blackberries, and immediately crush them and press out the juice or strain it off through a cloth. As blackberries contain comparatively little acid, no water should be added. To every gallon of pure juice add three pounds and a half of the best refined sugar, and put the mixture in jugs or jars, filling them completely full. Place them in a proper temperature for fermentation. After a couple of weeks pour off the clear liquid, cleanse the jugs and return it, adding to each gallon one pint of the best French brandy or bourbon whiskey. This is the best method of making blackberry wine, to use either as a most delicious cordial or for medical purposes. Thus prepared, it is a very valuable remedy in many ailments.

The following recipes I have found to be very reliable remedies for the diseases named :—

For chronic diarrhœa : blackberry wine, one pint ; pulverized gum kino, half an ounce ; tincture of opium, one-half ounce. Let the mixture stand one week, shaking it often. Dose for an adult, one dessert spoonful two or three times a day. For general debility and chronic weakness : blackberry wine, one pint ; carbonate of iron, one ounce. Dose, one tablespoonful three times a day before meals. Blackberry wine, with Peruvian bark and quinine, is also a sure and safe remedy for fever and ague. On the whole, it is one of the most valuable of our native wines.

HOW TO MAKE CURRANT WINE.

Take the best and ripest red currants, any quantity. Free them entirely from stems and leaves. Crush them, and strain off the juice through a thick linen cloth. Currant juice contains a large amount of acid, and it is necessary to dilute largely with water. To every quart of pure juice add two quarts of pure water. To every gallon of this mixture add four pounds of the best crushed white sugar. Let it be fermented three weeks in jugs, jars or clean casks, &c., and return it. Partially close the receptacles, but not so close as to hinder fermentation. Let the wine stand two months longer, and then bottle it and hermetically seal over the bottles, driving the corks very firmly before sealing. Put the bottles into a dry cellar. This wine will keep any length of time and improve by age. In convalescence from typhoid and other fevers, currant wine is fully equal as a medicinal remedy to the best imported port wine. It is also a promoter of digestion, and is a valuable remedy in dyspepsia. A bottle of currant wine once sealed up should never be opened until wanted for use. The admittance of atmospheric air injures both the quality and flavor, by absorbing the carbonic acid gas contained in the wine.

ELDERBERRY WINE.

The juice of the berries of the common elder (*Sambucus Canadensis*,) makes a most excellent wine. It has been in use in Northern Europe for more than two centuries, and is highly esteemed as a medicinal wine. The following is the English method of preparation, according to Peter S. Good:—

"Mix twelve and a half gallons of ripe elderberry juice and forty-two pounds of sugar with thirty-seven and a half gallons of water, that previously has had boiling in it six ounces of ginger; add nine ounces of pimento, bruised and drained off, and when rather less than milk-warm, almost cold, add one pint of good yeast, and let it ferment fourteen days in the barrel. Then bung it close and bottle it in six months."

COMMON METHOD OF PREPARATION.

Take common elderberries, free from stems, bruise them and express the juice. Add an equal quantity of water, and to each gallon of this mixture add four pounds of white sugar. Ferment the same way as currant wine, and bottle it. Some people add one pint of bourbon whiskey to each gallon of fermented wine before bottling. This gives more body, and will preserve it for an indefinite space of time. Elderberry wine is a stimulant tonic and slightly laxative. It is also an anti-scorbutic. It is useful in dyspepsia and as a laxative in habitual costiveness. It also has some reputation in eruptive diseases and in scrofula. The juice of apples, or common cider, can also be manufactured into very pleasant and palatable wine. The following is the most popular method:—

CIDER, OR APPLE WINE.

Take sweet and sour apples in about equal parts by measure. Let them be sound, pleasant-flavored and free from rot and worm-holes. Grind them in a mill, and let the pomace stand twenty-four hours, stirring it up often so as to expose it to the air. After the juice is expressed, add two pounds of refined sugar to each gallon of cider, and put it in a perfectly clean barrel for fermentation. Rack off after fermentation ceases, and cleanse the cask well, then return it and bung it up closely. Cider wine, prepared in this way and bottled after four months, is nearly equal to the best champagne wine, and is, in fact, very much like it.

The wine-plant, a species of rhubarb, is now quite extensively cultivated for the purpose of making wine. Rhubarb wine is a light, weak, delicate wine, and a very agreeable stimulant drink. Whether this plant will get into general cultivation for wine-making, future experiments and tests will probably determine. It is a remarkably prolific plant, affording a vast amount of semi-acid juice and not much sugar. The wine is made as follows:—

RHUBARB WINE.

Crush the stems of the leaves between wooden rollers, and express the juice. To each gallon of juice add three of water, and to each gallon so diluted three pounds of good sugar. Put into clean casks for fermentation. Bottle in due time.

In some parts of the State whortleberries are used for wine-making. These berries are gathered by the bushel in early autumn, and being so prolific and cheap, the wine can be made at a small cost; and it is very easily made. Whortleberries contain considerable sugar, enough acid, and a fine coloring principle. When well made it resembles port wine in appearance.

WHORTLEBERRY WINE.

Take ripe whortleberries, mash them, and express the juice through a thick cloth or sieve. Add an equal proportion of water, and three pounds of Havana sugar to the gallon. Let the must ferment under a proper temperature, and to every gallon afterward add one pint of pure whiskey. In a proper time bottle for use.

CHERRY WINE.

An excellent wine or cordial is made from the common black cherry, indigenous to this State. Bruise the cherries, and then add to them an equal amount in bulk of water. Let the whole stand together for a couple of days. Then strain off the juice and add to each gallon one quart of old rum and bottle it immediately. This preparation is a vinous spirit, agreeable to the palate, and moreover an excellent tonic. State constables might object to it as a strictly temperance beverage, nevertheless I shall take the liberty to place it among the catalogue of our native wines.

ORANGE WINE.

It is not generally known that a very delicate, light and fragrant wine can be made from the juice of oranges. It is a very grateful wine for invalids. I will give the method of making it: Take one dozen and a half of oranges. Slice them and pour over them one gallon of water, then express the juice by beating them in the water with a roller, after which express the juice. Add three and one-half pounds of refined sugar. Ferment and bottle the same as other wines.

I submit the foregoing remarks on wine and wine-making, hoping that the reader may be induced to manufacture his own wine rather than use a foreign article, high in price, and almost always adulterated, and not, when pure, any better than good domestic wine.

David Rice, M. D., *Chairman.*

FARM IMPLEMENTS.

HAMPSHIRE.

From the Report of the Committee.

Although we rejoice in the fact that mechanic arts have been so well represented, yet we cannot refrain from inquiring, Is this society doing all that it can to foster and encourage this interesting department of agriculture? What one branch of industry more important? What would become of the agriculturist if the machinery of his farm was to be taken from him? Imperfect as it is, to remove it would be a long stride backward.

It may be said that there is no danger of a retrogade movement; yet is there no cause to fear that the progressive movement will be too slow? Farmers should urge the mechanics forward by making known to them their pressing wants, and then offering proper inducement to encourage inventive, patient toil and thought. Inventors are generally poor, and need pecuniary aid. Manufacturers seek to make the most money possible out of inventions already made, often without regard to the greatest utility. How, then, is the progressive spirit and demand of the age to be met? Farmers are in some degree isolated, and it may not be easy for them to make known their wants as above indicated. Let the agricultural society be their organ, and, with liberal and specific premiums for each branch of mechanism, speak out in the ears of our inventors for the things most needed. We say *specific* premiums—for instance, the best mowing machine the first premium; second best, the second; third best, the third; and so on, with the several leading classes of machinery in use. We say *liberal* premiums. Is not the best plough equal in agriculture to the best bull? Is not the best mowing-machine equal to the best horse, or the greatest speed of a (it may be an inferior) horse? Let the premiums be equal.

We ask an equality with other classes which draw money. We believe the mechanical part of agriculture has been greatly overlooked, if not undervalued, by our agricultural society.

We ask also, in behalf of the mechanic, that a fair and impartial trial of his inventions be held, so far as possible, on the fair grounds, on the days of the annual fair. The advantages of such an arrangement are obvious. The Committee would be able to judge of the merits claimed by different exhibitors of the several machines which they represent; so would the public, who come to see all that is useful, novel and good. What better place than some of the unoccupied acres of the fair ground? Take, for instance, the plough, one of the oldest farming implements made by human hands; a very great variety of new and useful ones have sprung up, each claiming special merit.

But how shall this be determined, so that no imposition shall be practised by the sharp manufacturer upon the honest, hard-working consumer? Let the society furnish the means for a thorough test of all the points claimed by the exhibitor, in the presence of the multitude who may be there to witness, and then an impartial judgment may be obtained.

The first American patent of much importance was granted in 1831, and so rapid have been the improvements and demand for them that, it is said, in 1864 nearly ninety thousand reapers and mowers were sold in the United States. Now, is it not manifest, that while the demand for this kind of machinery increases so rapidly that the utmost care should be taken that *quality* should not be overlooked by quantity. In answer to a question put by your Committee to one of the exhibitors of mowing machines, referring to its particular merits, he proceeded at once to tell how many had been sold in a year. Now this is not important for the society or community to know; but if one machine will do the same (or more) work than the other, with less power, the mechanical parts being equal, then that is the machine wanted by every farmer. But the question arises, how shall we get at this result? We ask, cannot our society prepare its grounds in such a manner and put on such a crop as will bring the machines to a thorough and practical test? What we ask for the plough, the mower and reaper, we also ask for the rake, tedder, fork, threshing machine and all others which are of the greatest importance to the farmers. Let this be done at the expense of the society. It is for their benefit. It is a tax to poor inventors to bring their machines and remain on the grounds to exhibit them. But it may be said it will not pay. We ask, what society has tried it? If none, then why not ours?—ours, which being located in the same vicinity, and under the shadow of the Agricultural College of Massachusetts, ought, of all others, to be the one to take advance steps, while all the world looks on. *Let us move forward;* offer a specific and liberal reward for the best mowing machine, equal to that which may be offered for the greatest speed of a horse, and instead of two machines for competition, we have no doubt that there would be six times the number; and we believe the same would be true in reference to most, if not all, of the other agricultural implements and machinery used or needed in our community.

We hope to see the time when the mechanical part of agriculture shall be elevated to its true position and receive its proper share of encouragement at our annual gatherings. To what does the farmer owe his present high standing more than to his mechanical implements? Show us a man's tools and we will tell you what kind of a workman he is. To bring these tools to their present state of perfection has cost the mechanic a very great expense of time and money. It is not uncommon for an inventor to give several years of patient thought and study to bring about a single improvement, which, when made, seems so simple that the world exclaims, "Why was it not thought of before?" But being made, its value to the community cannot be estimated in dollars and cents. Give proper encouragement to the poor inventor—and may it not be expected that the coming generation will witness improvements far surpassing those of the present?

J. Adams,
Committee on Mechanic Arts.

HOUSATONIC.

From the Report of the Committee.

The improvements and inventions of the past century have been such that in many cases man's power to accomplish has been increased from five to one thousand fold. The various improvements of machinery, and the application of steam, water, horse, and other powers, to accomplish what was formerly performed by man's muscle alone, give man an opportunity to see, hear and reflect, and to bestow care and attention upon his wants, which adds greatly to his happiness and pecuniary condition. Perhaps in no trade, occupation or profession is there so much toil for the pay received as with the farmer, and he waits long and with great patience for the returns of his labor. But those returns are measurably sure; and as he reaches his hand down into the earth for an honest living he feels that he has prejudiced no man's just rights. And the farmer, having toiled long and hard for what he gets, knows the value of what he has.

Perhaps there is no class so slow to make themselves familiar with and adopt those improvements which will lessen their labors, as farmers. But it is only by inventing and adopting every means which will add to the efficiency of man's labor that the farmer can keep pace with the progressive age and maintain that position in the community that his industry and integrity should merit.

The improvements of agriculture, the success of agriculture, and above all the dignity of agriculture, must depend upon the education and the intelligence of those who pursue it. The success of the farmer of the present day does not depend mainly upon the amount of hard work he performs, but whether his returns are brought in with the least necessary expense; whether he secures the aid of such machinery and power as will enable him to accomplish the most with the least outlay. By the aid of the agricultural machinery of the present day, the farmer's life need not be one of constant toil. He can plant and hoe with machinery; he can mow, spread, rake and pitch with machinery. And it is for the purpose of showing to the farmer that it is for his interest to let the horses mow and rake that we are gathered here this day, and also to test which of the several kinds of mowing machines and horse-rakes are the best for use; and in making a selection, simplicity and durability, as well as ability to do, should be considered.

We should advise every farmer in Berkshire County to do what he can to make his meadows fit for the mowing machine and horse-rake; remembering that there will be horses when he is dead, and that horse labor is cheaper than hiring and boarding men; that by being able to do more in a given length of time he may secure his hay at the best season and in the best condition. And we will advise him that one ton of June cut hay is worth two tons of August cut; that large rocks may many times be disposed of in the cheapest way by sinking below the surface; and we further suggest that if this day's exhibition has not decided which is the best mowing machine, it has decided that to use either of the eight kinds exhibited is far better than to do the work by hand.

Most of the mowing machines were exhibited under the direct care of the manufacturers, who manifested a deep interest in their success; and, with the little time and opportunity your Committee had to test the various machines, we do not feel that our decisions should be made the test to govern others in their selections.

But of this we are sure, that no man who makes hay for profit can afford to do without a mowing machine and horse-rake. The man who puts his labor in competition with the labor of his neighbor's horse must toil early and late, work hard, and be content with small profits, as will be seen by the estimate which we append herewith. In this estimate we count man's labor at twenty-five cents per hour, and span of horses the same; and with present improved mowers, machine mowing is not hard work for man or horses—very different work from swinging the scythe by hand.

A man with a machine and span of horses will cut five acres in five hours; with rake and one horse will rake five acres in two hours. Five men will mow five acres in five hours, and three men will rake by hand five acres in five hours, and, allowing eight tons of hay to the five acres, the account will stand thus: —

Mowing eight tons hay with machine, . . .	$2 50
Raking eight tons hay with horse-rake, . . .	1 00
	$3 50
Mowing eight tons hay by hand, ...	$6 25
Raking eight tons hay by hand,.	3 75
	$10 00

Showing the cost in one case to be $3.50 per eight tons, or 43¾ cents per ton, and in the other $10 per eight tons, or $1.25 per ton; and in addition to this may be added the independence from hired help and the ability to secure the hay at the best time.

C. O. PERKINS, *Chairman.*

GREAT BARRINGTON, June 23, 1868.

PLYMOUTH.

From the Report of the Committee.

Commencing with the mowers, it will no doubt be interesting to give the historical fact that the first patent on a mowing-machine ever issued in this country, or any other, probably, was in this county, to Samuel Adams, of Kingston, about the year 1806. He was a poor man, and, as is too often the case with inventors, was ruined in what little possession he had in his attempt to lighten toil. He procured a horse and rode all the way to Washington to obtain his letters patent. And it is a matter for regret, that in the burning of the patent office by the British, in 1814, all record and the model of the principle for which he obtained a patent was lost.

When about twelve years old, the writer invented and made a working model of a mower, to the great amusement of the family, representing the horse, head in the thills, driving a machine with two scythes or cutters ahead, vibrating very rapidly the width of the mower. Fortunately, it never injured the inventor or anybody else ; and now we have to stand in judgment over five machines of different builders, all of which have a row of fingers between, and through which vibrate cutters precisely alike, the sections being made by one party for several manufacturers of mowers, and all that makes them mow is the rapid vibration of these cutters. Now, if all are adjusted and all sharp, why should one be better than another ? Each exhibitor claims nine out of ten of all premiums awarded in this and other countries ; therefore the decision comes not on different principles, but on the mechanical arrangement to produce the one result. Here again we find great similarity, all being driven by multiplied gears and crank motion.

Before leaving the subject of mowers, we will give a few practical suggestions, for farmers must be machinists in some degree, and study the mechanical movements in machines, practise the eye and ear to quickly observe imperfect running ; must have judgment in keeping journals in order—that is, in line tight and loose, oiled with the best of oil. Never put on whale or lard oil unless of the best quality ; sperm is the best ; but there are others prepared for the purpose which are good. Also be careful to see that the fingers are in line. Sometimes the machinist will adjust them by putting a " flunk " under, which may work out. We have seen machines running with some of the fingers more than a quarter of an inch out of line.

There are so many good machines now, that it will be found that their durability and good work will depend mostly on the man who has charge of them. With intelligent care they will run well a long time ; in the hands of ignorance they are soon destroyed ; and this remark applies to all the valuable improvements in farm implements.

PLOUGHS.

There was but one lot of ploughs exhibited, and those by F. F. Holbrook & Smith, of Boston. They were all excellent implements. But one new and excellent improvement was in having a detachable shoe on the land side, so that when the lip wears away a new one can be put on at a slight cost, instead of having an iron socket on the beam in which the handle is secured, thereby avoiding the weak points produced by the tenon and mortise. We would speak a good word for this firm for their endeavor, after having sold tools, to keep them in repair at the least possible expense, by providing as above, and then selling the repair pieces at a small profit instead of at a hundred per cent., as some do.

We would call particular attention of those unacquainted to their swivel plough. It is somewhat uncouth in its appearance, but it bears acquaintance, and will grow in favor ; for by it the field is ploughed from one side, avoiding back and open furrows. The mould-board swings under and to opposite sides, by the natural motion of turning at the ends, rather helping than adding to the labor of swinging. In addition to laying the field flat, its action on the furrow-slice is excellent ; the mould-board, being convex, has a stretching effect, drawing asunder the particles, instead of pressing and compacting like the concave mould-board, and when the sod is thrown over it has a peculiar sundered and loose appearance—an effect we shall more and more appreciate as we better understand both the chemical and mechanical importance of breaking the soil. But more of this in connection with the next implement,—

THE HARROW,

But one of which was exhibited, a new patent, by Caleb Bates, of Kingston. Its features being novel and on a new principle, will warrant a description. It has an expanding frame, like a cultivator without the handles. In the rear of the outside frames are verticle axles, on which are revolvers three feet in diameter, and on the middle frame in front is one twenty-eight inches in diameter. These are formed of metallic hubs, from which extend five radial arms, with two teeth in each except the front, which has one in each, making twenty-five teeth in all. The mechanism which makes these three revolvers rotate is a spade or paddle, of proper form to penetrate the ground easily. They are hung on one side of each outer tooth, perfectly free to fall out one side, and restrained on the other in a vertical position by the teeth themselves. By this simple arrangement, when the harrow is drawn forward, each revolver will have in front of the teeth on one side a spade five inches in width standing before them, while on the other side they come behind, and therefore lay flat on the ground, offering no resistance to the passage of the teeth on that side. The result is a constant rotation. Each spade, as it comes around to the line of draft in front, sets in and obtains its perpendicular at an angle of about forty-five degrees from the line of draft, and there remains stationary, with the exception of a slight twist until the axle passes by and brings it to about the same angle in the rear, when it comes forward edgways about ten inches and slips out on the surface and remains there until it comes round again to the front. A bar, lying across the frame in the rear, gives the means of expansion, six, seven or eight feet for a two-horse harrow. It clears itself from all loose material, and the teeth are prevented from balling by a slot in the spades, which cuts from the teeth everything that tries to catch, leaving the surface remarkably smooth and pulverized with one passage.

The invention grows out of a necessity for more rapid execution, and avoidance of the hardening effect of a drag-harrow. For it may be mentioned here that nothing will give so hard a tread to a newly-worked road as a few passages of a drag-harrow. Another want was a better chemical condition as well as mechanical arrangement of the soil. By that wonderful wisdom we see in Providence, the soil is made up of antagonistic principles, in various acids, alkalies and salts, to act upon each other. If the soil remains unbroken, and these things remain long in contact in one position, they become inactive, and the soil mosses over if not very rich. If so, it produces rank and innutritious plants. When the soil is broken, and the particles driven as far as possible from their original connections, and obliged to form new ones, the action is the same in kind, but less in degree. That is seen in putting an acid into an alkali, resulting in the soil in new compositions, and decomposition resulting in the production of plant-food.

And it will always be found that the more thorough the breaking, displacement and replacement of the soil, the greater the crop and the better the quality. It then follows, if we can have a plough that breaks the soil as it turns it, and a revolving harrow that acts like a pudding-stick, breaking and beating the soil right and left, we shall have larger hoed crops, followed by heavier burdens of grass for the mower to cut, making a greater necessity for what comes next—the

HAY-TEDDER.

There was but one of these exhibited, by Heman Copeland, of Campello, manufactured by the Ames Plow Company—the "American"—which is undoubtedly the best yet invented and before the public. It has not yet arrived at the acme of perfection, being too harsh for clover when partially made, the wheels travel on what has been shook up, too heavy of draft, and too costly. But, even with the faults that may be found, it is a most desirable implement, and no farmer should be without one who cuts much hay. Its faults are not mentioned for the sake of fault-finding, but to call the attention of inventors to these points.

INVENTIONS.

The first on the list is Langstroth's patent bee-hive, exhibited by H. B. King, of Taunton. This is a most excellent device for securing the greatest amount of honey from a given number of bees. It was constructed with a lower portion with as much again width as height, double-walled, so as to leave a dead air space as a non-conductor. The inside space, which is the bee's real home, is filled, except one-half inch space, with narrow frames, in which the bees build their comb in such a way that each sheet can be removed without disturbing the rest. Above this, the whole space is occupied with small boxes, to the number of twelve to fourteen, communicating with the story below by a hole in the usual way, with an outside cover to enlarge all and make a tight and neat hive. It was represented that the bees would fill all the boxes as quick as one, because it gave all room to work. And as the season is short for procuring honey, by this arrangement the harvest is secured. It all appeared so rational that we should give it a very high recommendation with the diploma, which is all we are allowed to give.

CALEB BATES, *Chairman.*

HINGHAM.

From the Report of the Committee.

At a meeting of the society held in the month of August the idea of instituting a trial of mowing machines, tedders and rakes, at the annual fair, was considered and discussed. It was thought expedient that a trial of mowing machines, and mowing with hand-scythes, and also a trial of tedders and wheel-rakes, should be held, for the benefit of farmers who wished to buy of the various implements, and also to give opportunity to manufacturers to bring to the trial the best implements manufactured. To carry this project into effect, a committee of three persons was chosen, and the society appropriated the sum of fifty dollars, to be used in prizes and gratuities. The Committee solicited contributions for exhibition, and entries for trial, of the principal manufacturers, agents and dealers in this class of implements in Boston, and also Alzirus Brown, of Worcester, builder of the Union Mower, and George B. Weaver, of Newport, R. I., sub-builder of the Clipper Mower. The Committee found a hearty response from all parties, and entries were made as follows: —

The Ames Plow Company entered for prize the Perry Mower for one and two horses; also the American Hay-Tedder, Burt's Rocky Mountain Independent Wooden-Tooth Rake, and also Burt's Self-Adjusting Wire-Tooth Rake.

Parker, Gannett & Osgood entered the Buckeye Mower for one and for two horses, Bullard's Hay-Tedder, New England Tedder, Bay State Rake, and Whitcomb Rake.

Whittemore & Belcher entered Walter A. Wood's Mower for one for two horses, and Whittemore's Lock-Rake.

The Kniffen Mowing Machine Company and E. E. Lummus entered the Kniffen Mower for one and for two horses, and the Kniffen Rake.

George B. Weaver, of Newport, R. I., entered the Clipper Mower for one and for two horses.

Alzirus Brown, of Worcester, entered the Union Mower for one and for two horses, and Whitcomb Rake.

The trial took place on lands of Wm. Davis, Esq., adjoining the grounds of the society, and was witnessed by a great number of persons, who appeared to enjoy the occasion.

The grass was quite thick upon a part of each lot, and put the several machines to a severe test, on account of clogging. The chief objects of the trial were to give an opportunity for all to witness the workings of the most popular implements at the same time, on the same field, at the ordinary rate of travel, and with the same usage, so that comparisons might be made between the work of each; and also to observe the comparative ease with which each machine was drawn. The Committee would state that they did not request the operators or agents to mow the plots of ground as quickly as possible, but, on the other hand, they desired that they might exhibit the excellent points of their machines by the ordinary, fast or fastest, and by the slow and slowest rates of speed; and the Committee offer their thanks to the operators for complying with their request.

The lots of grass for mowers with two horses were 4×10 rods=one-fourth of an acre; and the average time in mowing the same was about sixteen minutes.

The lots of grass for mowing machines with one horse were 42×165 feet=6,930 feet; average time about nineteen minutes.

The Committee submit the following list of prizes: —

For mowing machines, two horses: First prize, Buckeye, $10; driven by A. B. Barnard, of West Fitchburg. Second prize, Union, $5; driven by David Burr.

For mowers with one horse: First prize, Buckeye, $8; driven by A. B. Barnard. Second prize, Walter A. Wood, $4; driven by James Sampson.

Of the work of the several machines drawn by two horses, the Committee were for some time divided in their decision; but at last they unanimously awarded the first prize for "the best mowing" to the Buckeye mower. The prize was severely contested by the Union machine, and had their positions been reversed it is possible that the result would have been different. The Committee were not aware of any difference in the quality of the lots until after being raked. It was found that the lot mowed by Mr. Burr, with the Union mower, had a larger number of mole-hills than either of the other lots. The Committee were unanimous in the opinion that the Kniffen mower, driven by Mr. Griffin, cut the smoothest of any machine present; but the grass was not mown as low as seemed desirable to the Committee.

The Clipper mower for two horses did not arrive in time for trial, being delayed in Boston; and we much regret that such was the case, as we had expected most excellent work from this machine.

The trial of mowers for one horse took place immediately after that of the two-horse machines, and at the trial on the first day a majority of the Committee were of the opinion that the Wood machine was entitled to the first prize. The Committee, after discussing the quality of the mowing, and the difference in the thickness of the grass upon the lots mowed by the Wood and Buckeye mowers, concluded that there could be no impropriety in allowing the machines taking the first and second prizes (Wood and Buckeye) to work in reversed positions on the second day of the exhibition. The owners, or agents, cheerfully accepted the invitation to do so, and the result of the trial on the second day was that, in the opinion of the Committee, the Buckeye mower should receive the first prize, and the Wood mower the second prize. On the first trial, the grass on the lot mowed by the Wood machine was the thinnest and lightest of any lot mown, and that of the Buckeye happened to be the thickest and heaviest. The Committee are of the unanimous opinion that the Buckeye mower cut the *thin* grass as well as the Wood mower; while, on the other hand, the Wood mower failed to cut the *thick* grass as well as the Buckeye mower.

The Committee much regret that the Union mower for one horse was withdrawn from the trial, in consequence of the breaking of the connecting-rod.

In viewing the lots of ground mowed by hand, the Committee could form but one opinion, and that was, that most of the work done appeared to have been done in a hurried manner—too much so to exhibit the best skill. The mowing machine is a great assistance, and relieves the farmer very much, yet we see no chance for throwing the scythe aside; and we add, that should another exhibition of this kind occur, we hope the list will be full of competitors with strong arms and sharp scythes, and that this indispensable part of farm-work will receive the attention its importance demands.

Of all the improvements made in agricultural implements, or machinery for facilitating the labor of the farm, there seems to have been greater advancement made, within a few years, in the various implements necessary to secure the hay crop than in any other branch of farm labor.

If any one part of the exhibition attracted more attention than another it was the working of the hay-tedders. The grass upon which the exhibition of the tedders took place was new-mown rowen, some of which was very thick and heavy; but the grass was tossed by the rotary forks of the tedders in a manner often eliciting applause and laughter from the many witnesses present.

We are of the opinion that the hay-tedder cannot be too highly commended for general use on large farms, as one tedder with a horse and driver, in the opinion of good judges, is equivalent to the labor of from seven to ten men. They leave the grass very light, and, working with such thoroughness and great rapidity, they enable the owner to "make hay while the sun shines" in the true sense of the old adage.

There were three tedders on exhibition, and we award the first prize to the American Hay-Tedder, entered by the Ames Plow Company, and the second prize to Bullard's Tedder, entered by Parker, Gannett & Osgood.

The Committee are not aware that there was a great preference in the quality of the work performed; but, judging from the appearance of the horses when working them, they are of the opinion that the American Hay-Tedder is of the lightest draft, and that the labor of the horse that worked the Bullard Tedder was too severe.

The New England Tedder, presented by Parker, Gannett & Osgood, was easily drawn, and seemed to do the work very well; but throwing the grass towards the driver and horse. The Committee thought this feature quite a serious objection.

Of wheel-rakes there were five different patterns upon trial. The quality of the grass was so green and heavy that it seemed a very difficult task to accomplish the work of raking in a satisfactory manner, and the Committee make but one award, viz.:—

First prize for the best raking to the Bay State Rake, entered by Parker, Gannett & Osgood, of Boston.

On the second day of the exhibition the mowing machines were tested by a dynamometer, with a view to ascertain, if possible, the amount of power required to work them.

The several machines were put to the same test by being drawn, *in gear*, out of the grass, (not cutting,) and afterwards in the grass, (cutting,) for the purpose of estimating the amount of friction or loss of power in working the machines, and also to ascertain the amount of power required to cut the grass.

Of the mowers for two horses:—

	Out of grass, lbs.	In grass. lbs.	Difference, or amount for cutting, lbs.
The Buckeye required, . . .	172	277	105
Wood required, ...	190	288	98
Perry required, ...	230	342	112
Kniffien required, ...	203	255	52
Union required, ...	208	293	85

Of mowing machines for one horse:—

	Out of grass, lbs.	In grass, cutting, lbs.	Difference, lbs.
The Kniffen mower required, . .	90	168	78
Perry mower required, . . .	155	200	45
Buckeye mower required, . .	123	172	49
Wood mower required, . . .	130	200	70
Clipper mower required, . .	122	188	66

In presenting these figures, giving the amount of power required to operate the several machines, it is but just to say that the Buckeye mower for two horses, with a cutter-bar four feet six inches long, while others, except the Kniffen, were only four feet long, should be entitled to a proportionate deduction of power, or be accredited with cutting a wider swath with a given number of pounds draft. We have accordingly made a deduction of what we consider a proper proportion of power.

Buckeye mower for two horses, having a cutter-bar four feet six inches long, appears to be entitled to a deduction of one-ninth of number of pounds draft.

Buckeye, out of grass, 172 lbs., less one-ninth, 19 lbs., 153 lbs.
Buckeye, in grass, 277 lbs., less one-ninth, 30 lbs., . 247 "

Difference, ... 94 "

Buckeye mower for one horse, having a four feet cutter-bar, seems entitled to a deduction of one-eighth of power, or amount of draft, as others were only three feet six inches long.

Buckeye mower for one horse, out of grass, 123 lbs., less one-eighth, 15 lbs., ... 108 lbs.
Buckeye mower for one horse, in grass, 172 lbs., less one-eighth, 21 lbs., ... 151 "

Difference, ... 43 "

The Kniffen mower for two horses, having a cutter-bar four feet three inches long, seems entitled to a deduction of one-seventeenth of amount of draft.

Kniffen mower, out of grass, 203 lbs., less one-seventeenth, 12 lbs., ... 191 lbs.
Kniffen mower, in grass, 255 lbs., less one-seventeenth, 15 lbs., ... 240 "

Making a difference of . . . . . 49 "

And the figures will stand as follows:—

	Out of grass, lbs.	In grass, lbs.	Difference, lbs.
Buckeye mower, two horses, . .	153	247	94
Wood mower, two horses, . . .	190	288	98
Perry mower, two horses, . . .	230	342	112
Kniffen mower, two horses, . . .	191	240	49
Union mower, two horses, . . .	208	293	85
Kniffen mower, one horse, . . .	90	168	78
Perry mower, one horse, . . .	155	200	45
Buckeye mower, one horse, . . .	108	151	43
Wood mower, one horse, . . .	130	200	70
Clipper mower, one horse, . . .	122	188	66

The above figures are given as an approximation to right; and it is obvious, if the foregoing statement is true, that the Buckeye mower for two horses requires less power of draft out of grass than either of the others, and the Perry mower the most; and also that the Kniffen mower requires the least power to cut the grass.

Of the mowers for one horse, the Kniffen seems to require less draft than others out of the grass, while the Buckeye requires the least power in the grass.

For the Committee,

ISRAEL WHITCOMB.

MILCH COWS.

ESSEX.

From the Report of the Committee.

There are valuable animals in the county, of all the different breeds, and it is not uncommon to hear of twenty quarts of milk per day in the height of feed, and of ten quarts per day for the three hundred and sixty-five days, and of large amounts of butter made from one cow. How is it that we have so meagre a show in this department? Are gentlemen unwilling to certify to the amount their cows may give? Without facts it would be impossible for the Committee to decide, and we think the society has wisely determined that no premium should be given without a statement setting forth the amount of milk given during the first ten days of June and the first ten days of September, &c. This not only gives some data to the Committee whereby they may determine the merits of the different animals, but—what is of more importance—it gives to the farmer and the public a knowledge of what a good animal, well cared for, can produce in milk; and with this knowledge, every man who has a milch cow or a herd will compare the products of his own with those which are exhibited, and if there is a disparity he will inquire as to the cause; and we suppose that it is among the great objects of the society first to obtain the facts by exhibition and statement, and then to elicit inquiry and comparison.

We have heard it said that we cannot expect a man to bring his stock to the fair, on account of the trouble and expense that he must necessarily incur, for so small a return in premium, even if he should be so fortunate as to get one. In answer to this we may remark that every agricultural society is a joint-stock concern, in which every man who is a farmer or a friend to agriculture is a partner, or ought to be, and should be willing to do something for the company.

The society was formed to promote the interests of the farmers, and that has been its object and aim from its foundation to the present time. It has no offices of emolument, and those who serve take the honor, and the good that they may do, for their pay; and unless the farmers of Essex County are animated by this spirit, and by a genuine desire to excel, we must see the Essex Agricultural Society, instead of advancing, taking the retrograde course.

For the Committee,

Francis Dodge.

Statement of Paul T. Winkley.

I offer for premium the grade Durham and native cow Daisy, eight years old, with calf one day old by her side. She dropped her calf September 16, 1867. She gave, the first ten days in June, 9½ quarts of milk per day, and the first ten days in August, 4 and 5 quarts per day, and has been dry since the 30th day of August. She gives, when first in milk, about 16 quarts per day. She is a very hearty and easily kept animal, which is of considerable importance, and should be taken into consideration as well as milking qualities. Her milk is of excellent quality; but I cannot state as to the quantity of butter she will make, as we sell our milk in the market. Her keeping has been black grass and English hay in winter, and one quart meal and two quarts shorts per day; and nothing but a good pasture in summer.

Statement of Moses A. Plummer.

In regard to the feeding and general management of the herd of cows entered for premium, I would say that I feed them regularly, night and morning, with the best black grass hay, giving each a peck of brewers' grain a day; and that each cow is carefully groomed every morning. This is my treatment from the time they enter the barn in the fall until they are sent to pasture in the spring. The grain costs twenty cents a bushel at the brewery, and the hay sixteen dollars a ton at the barn. The cow Lupin dropped her calf the 1st of March, Lillian the 1st of April, Beauty the 20th, and Jenny the 22d of April. The average quantity of milk from the time they dropped their calves until the 1st of July was 16 quarts of milk apiece per day; and from that time to September 20 they gave from 10 to 12 quarts apiece per day. This falling off in milk was owing to the flies and short feed in the pasture. They were driven about one and a half miles to pasture. The age of Beauty is nine; grade Ayrshire and Durham. Jenny is eight; Durham and native. Lupin is five; Jersey and Ayrshire. Lillian is four; native and Jersey. Fanny dropped her calf September 19, and is eight years old, and gives now 16 quarts of milk per day. Texalaer is five; dropped her calf October, 1867, and is to have another the present month (October, 1868.) The milk is sold at the house at 6 cents per quart in the summer, and 7 cents in the winter.

MIDDLESEX NORTH.

Statement of Horace Holt.

The cow I enter for your examination is half Jersey and half Durham. She calved on the 30th of May last, and is expected to calve again May 2. Her feed was an average pasture and one quart of meal per day. She gave, in the second week in June, one hundred twenty-nine and one-half quarts, an average of eighteen and three-sevenths quarts per day. During the first week in September she gave eighty-six quarts, an average of twelve and a half quarts per day. Age, eight years.

CHELMSFORD, September 23, 1868.

Statement of John Higgins.

The cow "Fannie" I offer for a premium, was raised in Lowell, was ten years old last spring. Her blood is one-half Alderney and one-half native. She dropped her last calf April 3; will calve again February 16, 1869. The second week in June she gave twenty-five and one-half quarts of milk per day, and made thirteen and one-third pounds of butter per week.

The first week in September she gave fifteen quarts of milk per day, and made nine pounds of butter per week. Her feed in winter is good hay, with two quarts of shorts and one quart of meal per day. In summer, grass only.

Statement of James M. Swallow.

The cow "Lady Florence" I offer for premium was three years old the 28th of last April. She is half Dutch. She dropped her first calf, "Lady Florence 2d," June 1, 1867. Gave a good even quantity of milk all summer, and until into March. April 8, dropped "Lady Florence 3d." The first week in June she gave seventeen quarts of milk per day. The first week in September, eleven quarts. Her keeping has always been meadow and run hay in winter, English in spring, an average pasture in summer. A few shorts are given in the winter while in milk.

DUNSTABLE, September 22, 1868.

Statement of Sylvester Crosby.

One grade cow, eight years old, raised in Lowell by the present owner, Sylvester Crosby. Last calved May 2, 1868, and calves the 7th day of April, 1869. Has been kept, from May 2, 1868, to the present time, on not over three-fourths of an acre of pasture land, and two hundred and fifty pounds of fine feed and corn-fodder night and morning for the last five weeks.

Amount of milk given by said cow:—

For 25 days in May,	906	pounds.
30 days in June,	1,104	"
31 days in July,	1,807	"
31 days in August,	901	"
22 days in September,	801	"
Total for 130 days,	4,800	"

Statement of James T. Burnap.

The cow I offer for premium is a grade Durham, nine years old. Calved May 24, and is to calve again May 5, 1869.

Her keeping during the winter was meadow and English hay, two-thirds of the first and one-third of the latter; one feed of corn-fodder at noon, and four quarts of shorts daily.

She gave, the second week in June, one hundred and one and one-half quarts of milk, an average of fourteen and one-half quarts per day. Her yield the first week in September was ninety-one quarts, an average of thirteen quarts per day.

In summer the cow was kept in common pasture, with the addition of a small bundle of corn-fodder, morning and night, after August 20.

MIDDLESEX SOUTH.

Statement of Messrs. Sturtevant, of South Framingham.

Ayrshire cow "Jennie." No. —, Herd Book, Vol. 2. Five years of age. Last calved August 29. We believe Jennie's milk to be of superior quality, exceeding in richness that from our ordinary stock. Excellent heifer calf. When four years old, she gave, for the first week of September, 143 pounds; for the first week of November, 128 pounds; total yield for the year, 5,870 pounds.

No. —. "Tilly." Ayrshire Herd Record. Five years of age. Dropped a fine calf April 13, 1868. Served May 28, to calve last of February, 1869. Her yield for May was 1,071 pounds, (first week of May, 161 pounds;) her yield for June was 1,062 pounds; her yield for July was 840 pounds, (first week of July, 219 pounds;) her yield for August was 724½ pounds. Under date of June 12, I take the following record from the books: "'Tilly' is fed on cut grass and one quart of oil-meal. At no time has she been fed as high as the other cows. At no time more than seven quarts of shorts, with long hay and one quart of either corn or oil-meal." In July, no grain; in August, one quart corn-meal daily.

This is only a portion of the systematic record of the dairy. No efforts have been made for an extraordinary yield. Excellent calves. On one trial, Jersey gave 15 per cent. cream; Tilly, (Ayrshire,) gave 9 per cent.; average natives, 7½ per cent.

No. —. "Fanny." Ayrshire Herd Record. Seven years of age. Calved December 25, 1867. Served February 22, 1868. Yielded in January 1,090 pounds, (first week of January, 273 pounds;) in February, 874 pounds; in March, 822 pounds, (first week of March, 190½ pounds;) in April, 714½ pounds; in May, 683 pounds; in June, 694½ pounds; in July, 559½ pounds; in August, 450½ pounds. In June, July and August fed on green food. During winter and spring months, consumed, on a daily average, nine quarts shorts, one quart linseed meal and two quarts corn-meal, with corn stover and a poor quality of hay. Excellent calves. On one trial, Jersey gave 15 per cent. cream; Fanny, (Ayrshire,) gave 8½ per cent; average natives, 7½ per cent.

Statement of Henry Bright, Jr.

Milch cow, grade Durham; dark red; eight years old. She calved last in May, 1867, and missing service, will not calve until October, 1868. She gave thirty-eight pounds of milk per day all summer of 1867, and continued giving about that quantity most of the fall, gradually falling off to twenty-eight pounds during the winter. When turned out to grass in May, 1868, she increased to thirty-two pounds per day; and in July, 1868, fifteen months after calving, she gave twenty-seven pounds per day, and now gives ten pounds per day, and is to calve in about three weeks.

Statement of Luther Stowell.

The cow I enter for premium is nine years old. She dropped her last calf January 17, 1868. The calf was taken from her January 24. Seven days in January she gave 136½ quarts of milk; weight, 273 pounds. From January 24 to February 6 she made twenty-six pounds of butter in thirteen days. Winter feed was two quarts of shorts per day. Seven days in June she gave 104 quarts; weight, 258 pounds 9 ounces. She was turned to pasture May 24. Three months from January 24 she made 122¾ pounds of butter, and sold 279 quarts of milk. Her feed since has been pasturing.

FRAMINGHAM, September, 1868.

Statement of S. B. Bird.

The cow which I present for premium is a grade Ayrshire, and dropped her calf the 25th of May; and in seven days in July she gave 271 pounds of milk, and in seven days in September she gave 238 pounds. Her feed in July was grass, and in September grass and corn-fodder. The calf was sold, at six weeks' old, for sixteen cents per pound, and weighed 118 pounds.

WORCESTER NORTH.

From the Report of the Committee.

The writer has been lead to inquire, in view of the exhibition just closed, if the offer of premiums for milch kine accomplishes all that is intended or desired? The competing animals are required to be upon the ground ostensibly that the public may have the benefit of an examination; but no one knows, from first to last, except the Committee and a few anxiously inquiring competitors, which of the many present are superior, or what their good points may be, so far as the opinion of the judges is concerned. The peculiar value of a milch cow is made manifest in and through the milk-pail. This record can only be known when the published report and statements are distributed, some three months subsequent to the exhibition. That portion of the public which is interested in such matters has no opportunity at that time to make any comparisons, and has so far lost definite recollection of the subject that the advantages which the exhibition might and ought to have furnished have come to be of comparatively little importance.

If an exhibition of this sort is worth anything, its value is to be found mainly in its power to *educate* the people who attend. The young dairy farmer, more particularly, visits the exhibition to see the best cows, learn what they have done, and to make such comparisons between the best and inferior ones as will enable him more successfully to select, for rearing or purchase, a class of animals that will be likely to give improved results. If, however, the record is not to be found, and the judgment of the Committee cannot be ascertained, the whole affair has for him little more value than a painting or a collection of photographs of the animals.

To obviate these objections, I venture to suggest the propriety of posting the statements, or copies of them, in connection with the descriptive cards, and that the judges be instructed to designate in some manner the prize animals as soon as the awards are completed.

The question was asked by a number of different people, committee-men and others, why grade cows should be compelled to furnish a record of their doings, while any and all of thoroughbreds were required to show only who their ancestors were? A cow giving too little milk to fairly nourish her calf might, if her pedigree was all right, obtain the preference over another as nearly perfect in all other respects, and very much superior in this one. If a milch cow has any particular value as such, she ought not to be permitted to thrust her pedigree in our face as the only answer when we inquire what quantity of milk she gives, or how much butter or cheese can be obtained from it. It need not be inferred that a grade cow should compete with a thoroughbred, but all the cows of any one of the different breeds ought to compete with all others of the same breed that can properly be classed together, and they should each tell the whole story of their qualities and accomplishments as milch cows.

The accompanying statements give "pasture," in most cases, as the staple food of the animals. This term does not convey a very definite meaning. Pastures vary very much in the quantity and quality of food which they furnish. Some are noted for their power to fatten animals rapidly, while others have an undesirable reputation in that respect. Varying soils and different grasses have diverse influences over the milk-pail; and though it is probably an unprofitable method of keeping cows, yet they will undoubtedly continue to be pastured until a denser population and an increased demand for land shall bring about a less wasteful and more enterprising and satisfactory plan.

No farmer can fold his hands and justly claim to have mastered his business so long as he holds an acre of land that is not producing all that it is profitably capable of. The application of this rule would at once convert all of our pastures into either mowing, tillage or woodland. No one will contend that a pasture requiring from two to eight acres to keep one cow bears favorable comparison with a piece of mowing land producing three tons, at two crops, even at the valuation usually placed upon each; and yet very much of our pasture land is made up of as good soil, and is as favorably situated as the best mowing, requiring only proper working and manuring to make them equal. If a pasture is too rocky, or, by reason of its location or otherwise, it is found to be impracticable to work it, the planting of forest trees offers a very much more remunerative return to the holder than pasturage. The price of wood and timber promises in the near feature to command a relatively higher price than it bears even now.

It may be said that cows do much better when pastured than when confined, either upon the system of green soiling or what may be denominated dry soiling. This, however, is never asserted by those who have tried both methods, the whole of such testimony being the other way. We feel convinced, from our own limited experience, that it is perfectly feasible, and that no valid argument can be brought against the system of keeping milch cows in the barn, with perhaps an hour or two occasionally in a yard. They are perfectly contented under such circumstances, and thrive as well, and in a year will give more milk than when allowed to range in ordinary pasture. It is not by any means necessary to raise green food for soiling, but they may be kept upon early cut grass made into hay. This has been our custom for two years past, the cows not getting a bite of grass, nor indeed being allowed to be once outside the barn. A writer in the "Scottish Farmer" mentions four cows that he reared from calves, that had never set foot in a pasture, and in fact had never stepped out of the stall except when sent to the bull. He fed with mown grass during the summer season, and upon hay in the winter.

The result of such a system of feeding is an accumulation of manure that will easily hold the grass land up to a high point of productiveness, in comparison with which pasture land grows more and more unsightly and unremunerative. The relative prices which dairy products bear in the market, and which they must continue to maintain, for the reason that the limited dairy region is constantly becoming less in proportion to the increasing consumption and demand, ought to suggest to the farming interest, on all suitable lands, that its success lies in making the most of its opportunities; that its great leading staple should be grass, to which other crops are only adjuncts or secondary; that the best crop of grass is not to be obtained by a system of culture which only feeds it with manure previously strained through a crop of potatoes, followed by corn and grain; and, as a final curse, turns the cows upon the mowing fields in October and November, to starve upon dead stubble that affords no nutriment to the animal, but deprives the grass of that natural protection which is one of the best guarantees of a succeeding crop.

JABEZ FISHER, *Chairman.*

Statement of J. P. Reed.

I offer for premium one herd of four cows, aged respectively four, five, six and seven years; grade Holderness breed. Their produce in milk, at the June trial, was 984 pounds; their keeping only pasture feed. At the September trial it was 756 pounds; their keeping, in addition to pasture, was two bundles of corn fodder and one quart of Indian meal each per day. Time of last calving, as follows: Four years old, March 24, 1868; five years old, March 30, 1868; six years old, April, 1867; seven years old, March 25, 1868.

I also offer for premium one milch cow, age seven years; breed, grade Holderness. She gave, at June trial, 314 pounds of milk; in September, (six days,) 234 pounds of milk; keeping as before stated. Time of last calving, April 8, 1868.

I also offer for premium one cow for butter, aged seven years; breed mixed. She produced in six days, June trial, 10 pounds of butter; in September, six days, 7¼ pounds. Time of last calving, February 11, 1868; keeping as before stated.

I offer another cow, eight years old, Holderness breed, for premium for butter. Her produce in butter in six days, in June, was 11 pounds 14 ounces; at September trial, 10¼ pounds; keeping as above stated. Time of last calving, February 29, 1868.

I offer one heifer, age three years, breed, grade Holderness, for premium as a milk heifer. She gave, first six days in June, 240 pounds of milk; corresponding days in September, 192 pounds; keeping as has been stated. Time of last calving, May 8, 1868.

My cows have always been milked in the stable, and, almost without exception, by the same persons; time of milking has been very uniform. They have remained in the stable every night, and all the feed they have had in addition to pasture has been given to them there.

PRINCETON, September 21, 1868.

Augustus Whitman's Statement.

GRADE SHORTHORNS.

NAME.	Age.	Date of last Calving.	Weight of milk for 7 days, ending	Weight of milk for 7 days, ending	Weight of milk for 7 days, ending
			lbs.	lbs.	lbs.
Ruby, .	7	Feb. 9, '68,	– –	June 7, 169¾	Sept. 7, 129¾
Effie, .	–	June 10, '68,	– –	18, 194¼	7, 104
Rosa, .	5	April 9, '68,	May 29, 272	18, 262¼	7, 143
Flora, .	5	Dry in calf.	– –	Dry.	Dry.
Lily, .	7	April 6, '67,	Apr. 21, 136	18, 131	7, 83
Blanche,	7	July 29, '68,	– –	Dry.	7, 160½
Rhoda, .	2	Aug. 29, '68,	– –	Dry.	7, 161½

The herd has been soiled the entire summer upon oats, vetches, corn-fodder and grass cut for them. A few of the herd, low in flesh, have had the equivalent of four quarts of shorts per day, the rest nothing but green feed.

Statement of N. B. Reed.

I offer for premium one herd of four cows for butter. Their ages are: No. 1, thirteen years; No. 2, ten years; No. 3, five years; No. 4, four years; breed mixed or grade, raised in Princeton. They all of them dropped their calves in February last, and are to calve again in January, 1869. They made, in the June trial, thirty-three pounds of butter on grass feed alone, besides what milk and cream was used in the family of six persons; the corresponding days in September, twenty-four pounds, with a family of nine persons. Keeping, pasture, with fodder corn.

I have made, during the past six months, from the four cows, six hundred and eighty-six pounds of butter, besides furnishing milk and cream for a family of from six to nine persons. I have sold my butter for fifty to fifty-six cents per pound.

PRINCETON, September 21, 1868.

Statement of I. B. Woodward.

I wish to enter for premium one black cow, (name "Topsy,") for butter. "Topsy" was five years old last March. She dropped her calf in February. Her keeping was only good hay, which was given her until the first of June, then she had nothing except the pasture with the other cows. The first six days in June she made thirteen and one-half pounds of butter. The six days in September her milk made six pounds. She had only the pasture and cow corn at night.

FITCHBURG, September 18, 1868.

Statement of Joel Page.

I offer for premium one heifer, three years old last June, grade Durham. She dropped her calf August 5, 1868.

The first six days in September her milk weighed $177\frac{12}{16}$ lbs.; average per day, $29\frac{10}{16}$ lbs. Her keeping has been pasture, with fodder corn and two quarts of barley or cob meal per day.

Statement of Paul M. Mirick.

I offer for premium one heifer for milk, two years old the 28th of April last. She dropped her calf the 12th day of June, which I sold for veal, the 24th of July, for twenty dollars. At the September trial she gave 110 pounds of milk. Her keeping through the winter was swale hay; in summer, has been pasture with three cows. The feed in pasture has been dry and short since about the first of August. She has had fodder corn once a day since the fifth of September.

PRINCETON, September 24, 1868.

STOCK.

WORCESTER SOUTH.

From the Report of the Committee.

AYRSHIRE AND GRADE AYRSHIRE.

Should we say that we consider this stock superior to any other breed, the statement would be taken as a matter of opinion; for while the farming community have had their attention called to blood stock for many years, a more special attention has been called to this subject within a few years, and the number of animals of various breeds is yearly increasing. All have their advocates and all have their good qualities. Should any one breed for beef or for heavy oxen, and should their locality afford a bountiful supply of food, no doubt they would look for the Shorthorns. And in fact, we have seen cows of very large size and superior for their milking qualities. The Devons have received a due share of attention, and we have noticed fine herds of this breed that would compare favorably with other varieties—symmetrical in form, beautiful in color, and hardy to endure the severity of our New England climate. In the eastern section of the State, in many places the Jersey cow largely predominates—not for her size or beauty, but for the richness of her milk, particularly for butter-making, as it requires a much smaller quantity for the same amount of butter. On the island of Nantucket the Jersey cow is largely taking the lead, and is highly spoken of for milking qualities, both for quality and quantity. The Ayrshires, although not large in size, are reported to be superior for the dairy, giving larger returns for the same amount of keeping, and better adapted to a large portion of New England than the larger breeds for dairying purposes, especially cheese-making. We have seen this year a report of an Ayrshire cow, that has given within the year 4,000 quarts of milk. This is a remarkable quantity for any cow to give within a year, and probably but few of any breed could be found to come up to this quantity; but it leads us to conclude that a superior cow is far more profitable than an inferior one, although the first cost might be double the price of a medium one; for, after the first outlay, the cost of keeping for one cow, although a good one, is no more than for a poorer one. Fifteen hundred or two thousand quarts of milk for a cow to give in one year is a fair quantity. Now if one is found that will give twice that quantity in the same time, a hundred dollars extra would be a very profitable investment for the best cow. We cannot have all our cows the best; but by careful attention we can do much towards improving the quality of our dairy stock. We think it is generally conceded that grades, for all practical purposes, are equal or superior to pure blood, but that it is very important to breed from thoroughbred animals. Whether we give attention to breeds or not, if we look for our own interest, we shall exercise great care in the selection of cows, and also in the attention they receive, especially during the cold season of the year, by regular feed, and not unnecessarily exposing them to storms or severe cold.

N. S. Hubbard, *Chairman.*

HAMPSHIRE.

From the Report of the Committee.

In all ages of the world, and in nearly all countries, cattle husbandry has been a chief source of wealth and prosperity. In this matter our country or State is not an exception. The early settlers brought cattle to Virginia and New England with their first emigrations, and cultivated and propagated them with the greatest care to secure their numbers, though they neglected the essential principles of breeding, for pure and fine stock. These first importations were from the West Indies, England, Holland and Denmark. The Virginia cattle were from England and the West Indies; the New York settlers brought theirs from Holland; Massachusetts procured hers from England, and New Hampshire hers from Denmark. These cattle were exchanged between the colonists, and, however pure the original importations might have been, they soon became a mixed race of various forms and colors. The Denmark cattle seem to have left their impress on most of the New England cattle, and it can be determined by their yellowish color. From these Denmark importations came the splendid working stock of the Northern States—a better than which cannot be found in the world. Cattle increased rapidly in the country, and we find that during the last century it was a leading pursuit of the farmers to grow stock and manufacture butter and cheese. At that time dairies numbering from fifty to seventy-five cows were not uncommon. The efforts of stock-growers a century ago were little directed to the growing of stock with care for specific purposes, as for beef, milk, butter or cheese. Later breeders in this country, but more especially abroad, have, by great care and discrimination, developed breeds of cattle unlike their original stock, which are adapted to special localities and purposes, until now we have a stock for milk, for beef, for butter, and for cheese. The Ayrshire is the representative of the milk and cheese breed, the improved Shorthorn is the animal for beef, the Devon and Jersey, but especially the latter, is the breed for butter. The Jersey is probably the best butter cow in the world, but the Ayrshire gives more milk. The milk of the Jersey is not the richest; but all its oily globules, which form butter, separate quickly and completely, leaving the skim-milk poor; on the contrary, the milk of the Ayrshire does not separate completely, and the skim-milk is rich. The Shorthorn and Devons, or crosses of them, and our so-called native cattle, make our finest workers. These different pure breeds, if long bred, have attained the power to transmit with great certainty their distinctive qualities to their descendants; and the longer bred the greater their power of transmission. A single animal of an unknown stock may possess remarkable and desirable qualities; but they are from chance, or a combination of circumstances which cannot be traced, and from which no law of breeding can be deduced, and the animal does not possess the power to transmit them. In breeding for a specific purpose it is absolutely essential to use such animals as have been long bred for that purpose, and have the power of transmission fixed; and there can be no *certainty* in any other method, though a good animal may be occasionally produced. Your Committee feel compelled to say that this mode of breeding is not so extensively practised by the stock-growers of the society as would be commendable or profitable. Compared with our whole stock, there are few thoroughbreds of any breed; yet we are gratified to find on our exhibition grounds splendid specimens of the Shorthorn, Jersey, Ayrshire and Devon stock. Nothing could exceed the beauty, symmetry and perfect build of the Shorthorn bull of Mr. Arthur Norcross, of Monson, or the majestic animal of Mr. Kimball, of Enfield. It would be a blessing to our farmers if they could be extensively used, and leave a numerous progeny carrying their qualities. Mr. Cobb exhibited his stock calves, from butter-making Jerseys; and Mr. Sweetser, of Amherst, had specimens of Ayrshire on the ground. Grades and crosses were numerous, and the departments of working and fat cattle were well filled. The whole number of animals in the line of neat stock on exhibition was larger than on previous years, and numbered nearly three hundred. It may be remarked that the quality of the miscellaneous stock showed evidence of increased attention to this branch of husbandry, and was a commendable advancement in the right direction, and should be followed by a more general introduction of pure-bred stock, or the universal use of thoroughbred bulls. The exhibition of sheep, swine and poultry was unmistakably an improvement on some former years, and, if a fair sample of the stock of their owners, was encouraging as well as commendable. The exhibition of young, growing horses, and of breeding-animals of this class, was hardly equal to some former years; and can, we hope, be accounted for by the fact that smaller premiums were offered in this class than was formerly our custom. We trust the exhibition was no indication of a want of interest in the equine race, or of effort to improve and increase this branch of our own agricultural industry. The amount of all premiums offered for horses was $153, while for cattle there were offered $462. These offers were in proportion to the number of animals of the two classes in the county, but not equal in proportion to their value. By the returns of 1865, the whole number of cattle in Hampshire County was 16,534; the number of horses was 5,761. The value of the former was $761,384, and of the latter $492,015. If these returns are correct,—and they are presumed to be,—higher proportional premiums might be paid on horses without injustice to the breeders of neat stock. These premiums, however, should be given to breeding animals of both sexes. The returns of the year above mentioned indicate the value of cattle husbandry to the people of this county, in its annual income of money. The capital thus invested brings a yearly return, in milk, butter, cheese and slaughtered beef, of $462,761—and this exclusive of beef fattened here and sent away for slaughter; if the value of this beef were added it would increase the annual income of this branch of industry to more than three-fourths of a million of dollars. This, however, is only one and the smallest item of profit of cattle husbandry. Its greatest source of advantage and ultimate yearly profit is in the increased value and fertility of our farms. Our lands cannot be cropped, and the elements of fertility thus taken off be carried to a distant market, without reducing their capacity for succeeding crops. These crops, however, fed to animals on the farm judiciously, will return a satisfactory profit, and give us the means for further cropping, while with care the soil will increase in fertility. For this purpose mature animals to fatten are undoubtedly the best. Young, growing stock are taking from the soil its nitrogenous elements to form muscle, its mineral elements for their bones—and these must in the end be lost to the farm. Milch cows, by the production of butter and cheese for market, but especially the butter, also are the agents to remove the same materials in large quantities. Mature stock fattened carry off very little but carbonaceous matter, which is abundantly supplied by nature, and can be cheaply obtained by the farmer himself; hence farms used for dairying should be supplied from outside sources with mineral elements of fertility, or they will eventually deteriorate in producing-power. In view of the increased number and quality of cattle exhibited, we feel sure that our farmers are advancing in the right direction; but hope their forward steps will be accelerated, for it is true now as ever that there is much increase by the strength of the ox.

For the Committee, LEVI STOCKBRIDGE.

HAMPDEN.

Statement of George C. Fisk.

My cow "Becky" is a thoroughbred Jersey, three years old, and dropped her first calf in March last. "Becky" was turned to pasture May 13th last, and has had nothing to eat but grass since, except for the three weeks preceding the fair, when two quarts of meal per day was added. Each milking was weighed, and the following is a summary of the result:—

19 days in May	$711\frac{1}{2}$	lbs.	Average per day, $37\frac{1}{2}$	lbs.
30 days in June,	$1,043\frac{3}{4}$	"	Average per day, $34\frac{4}{5}$	"
31 days in July,	$997\frac{1}{4}$	"	Average per day, $32\frac{1}{6}$	"
31 days in Aug.,	$907\frac{1}{2}$	"	Average per day, $29\frac{3}{10}$	"
30 days in Sept.	$813\frac{3}{4}$	"	Average per day, $27\frac{4}{7}$	"
141	$4,473\frac{3}{4}$			

Average for 141 days, ... $31\frac{102}{141}$ lbs.

Statement of Josiah Bumstead.

The milch cow "Beauty" is three-fourths Jersey, four years old, and calved May 20, 1868. Weighed her milk, as follows:

8 days in May, ...	294	pounds.
30 days in June, ...	1,245	"
31 days in July, ...	1,140	"
31 days in August, ...	1,046	"
30 days in September, ...	993	"
130	4,718	"
Average for 130 days, ...	$36\frac{34}{65}$	pounds.

HINGHAM.

From the Report of the Committee.

On our first exhibition, that class of cows called "native" was much more prevalent than now, and some of the specimens of imported stock were not such as were shown at our late fair. We think there are some excellent families of Jersey stock that have become acclimated since the formation of this society, and the specimens presented seemed as hardy as did the native cow of our early exhibitions. One further remark: that class of stock popularly known as "grades," seems to have assumed a more general type than in the early exhibitions of the society. We have not the record to produce facts, but, judging from memory, we should say of the grades present at our late fair, that there must have been a preponderance of Jersey blood with native and other crosses of about four to one of other breeds. By this we mean to say that in our opinion the stock of grades would be three-fourths Jersey and one-fourth natives; and we must add that in our estimation about seven-eighths of the grades were crossed with Jersey blood.

I. Whitcomb, *Chairman.*

Statements of contributors of milch cows and heifers are here appended:—

David Whiton's old Jersey cow gave, in the first and second weeks in June, one hundred and fifteen quarts of milk per week, and made twenty-three pounds of butter in the same time. Mr. Whiton's three year old Jersey heifer dropped her first calf April 15, 1867, and through the months of June and July she averaged twelve quarts of milk per day. The smallest quantity of milk given in any one day, up to the time of dropping her second calf, was three quarts. In the third and fourth weeks in June, 1868, she gave ninety-one quarts of milk per week, and made nineteen pounds of butter from the milk of two weeks.

Henry M. Hersey's Jersey heifer "Beauty," two years old, calved May 12; averaged ten quarts of milk per day, and made thirty-one pounds of butter in the month of July. Mr. Hersey's Jersey heifer "Daisy," three years old, calved April 7; averaged twelve quarts of milk per day, and made thirty-seven pounds of butter during the month of June.

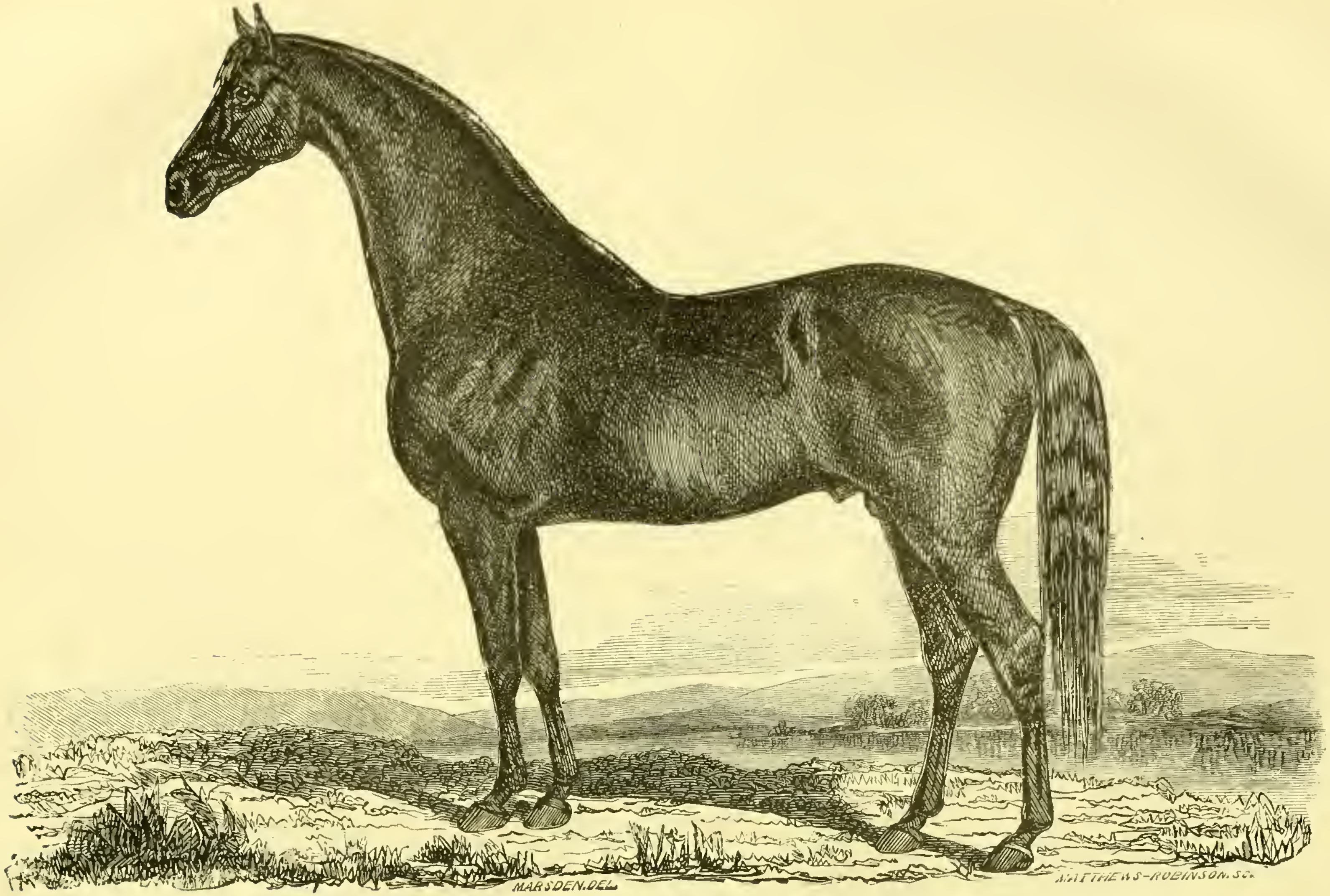
Dominick Thompson's Jersey cow, on the twentieth of June, gave thirteen quarts and one pint of milk. The same weighed twenty-nine pounds and twelve ounces, and yielded one pound and fourteen ounces of butter. September 20, the yield of milk was nine quarts, weighing nineteen pounds and five ounces, and yielding one pound and three ounces of butter. From one quart of the last of her milk, for five milkings put together, making five quarts of milk, was made one pound one and one-half ounces of butter.

Israel Whitcomb's grade cows "Lady Simmons," one-half Jersey, one-half native, and "Minnie," seven-eighths Jersey and one-eighth native, made together, in the month of April, ten pounds of butter; May, forty-five pounds three ounces; June, ninety-six pounds fourteen ounces; July, seventy-nine pounds ten ounces; August, sixty-eight pounds four ounces; September, sixty-seven pounds ten ounces; making a total of three hundred and sixty-one pounds nine ounces from April 17 to September 30. Each of the cows had calves in April, which were furnished with new milk until they were five weeks old, which accounts for the limited quantity of butter in April and May.

HINGHAM.

From the Report of the Committee.

When we consider the importance and the demand for the best stock that can be furnished, with a view to an increasing want for a breed of cows for the dairy, which shall be great producers of milk, of a quality rich in nutriment and abounding in the elements that make cheese and butter, we shall duly estimate the efforts of those who have entered upon a course of experiments to test the merits of the several breeds of cows, the most celebrated in those countries of Europe where especial means have been employed for many years to obtain these results. Whether these foreign breeds of cattle are to supersede the ill-bred common stock which for more than two centuries has been raised among us, and which has become inured to our soil and climate, is one of the results these experiments must work out. In the mean time the increased demand and the high price of all promising cattle of the imported breeds make it an object, in a pecuniary point of view, for the farmer,


MARSDEN.DEL
MATTHEWS-ROBINSON.SC.

"FIGARO."—BREED AND OWNED BY ORIN TROW, HARDWICK, MASS. By imported "CONSTERNATION."
Hight, 16½ hands. Weight, 1,200 lbs.

at present, to breed these to the neglect of the other. And it requires no small amount of judgment and foresight to determine in which line of distinct breeds he shall fight his way to present pecuniary success or future permanent advantage to himself and to the community.

At the threshold of these experiments stands the bull. Any defect here can be remedied only by long and skilful effort in eliminating the same; and the value of the imported bull lies much in this, that he is the result of such care in the experiments, as the breeders of Europe have been enabled to devote to this subject, over the imperfect manner with which breeding has been conducted among us. To attain equal results here requires the same knowledge and care that have existed there; and no society devoted to the cause of agriculture has accomplished its work until it has entered upon such a course of action as shall induce the farmers connected with it to pursue the best known methods of attaining these desirable results. That something has been done in this direction by the Hingham Agricultural and Horticultural Society is made apparent when we institute a comparison of the stock at its several exhibitions. That more systematic methods are needed in order to make the society as useful as is desirable is also very apparent to any one who has been called upon to serve on the several committees on stock. From this defect in system your Committee were unable to gain that knowledge, in relation to the several animals on exhibition, which was important for them to possess, in order to make a fair award of premiums. But few of the exhibitors or their representatives were at the pens to give such information; and most of the stock embraced under the head of calves was so scattered and interspersed among other stock, and in many cases so imperfectly indicated by the cards upon the pens, that your Committee have doubts whether they succeeded in discovering all that were on exhibition; and they present their award of prizes with no great degree of confidence that their award indicates any remarkable degree of skill and judgment in discovering the occult qualities which undoubtedly exist in the very excellent specimens subjected to their inspection, and whose comparative merits were passed upon by their award.

Q. BICKNELL, *Chairman.*

NANTUCKET.

From the Report of the Committee.

GRADES AND NATIVES.

In using the terms "thoroughbreds," "grades" and "natives," they can only be understood to express relative degrees of improvement, by breeding and rearing, upon stock which has been perpetuated at random. The term "native" is of course in this country an anomalous expression, since the nearest approach to native cattle on the American continent is the bison of our Western prairies. The idea which is expressed by the term could be more properly rendered by the word "acclimated," since it is by the peculiar influences of our climate that the distinguishing features of American cattle are produced.

The word "thoroughbred" indicates, as an analysis of it will show, an animal produced by a *thorough* course of *breeding* or attention on the part of mankind; and in using the term "grade" we indicate the different degrees or *grades* of approach to the maximum point of excellence.

An acclimation of over two hundred years has produced upon our island a kind of stock possessing numerous peculiar characteristics. As a general thing, the cattle of Nantucket have not been pampered by the tenderest care nor the richest pastures. They have been accustomed to roam over our widely-extended commons, which are never over-abundant with verdure, and where the exercise necessary to procure food would seem at least sufficient to insure a thorough digestion.

Generally speaking, the *native* cattle of Nantucket are of medium size, cleanly built, without much superfluous flesh, active, and of robust constitution, and able to subsist with a very reasonable amount of food and attention. Their milk is usually of fine flavor, and the butter produced from it is pronounced by connoisseurs to be equal to any in the United States.

Since the formation of the Nantucket Agricultural Society the attention of our farmers has been drawn to the improvement of their stock, principally by crossing it with Ayrshire and Alderney thoroughbreds; and the distinguishing features of these two great families can now be seen plainly stamped upon scores of Nantucket cattle.

We have good advantages in Nantucket for producing an improved grade of stock—advantages somewhat resembling those of the Channel Islands of England. The near proximity of the Gulf Stream to our shores causes our climate to approach nearer to that of Jersey, Alderney and Guernsey, than does the climate of any other part of New England; and in point of isolation, and freedom from trouble by any intermingling of foreign stock, our advantages are fully equal to theirs.

The republican spirit of our New England farmers will probably never allow that exclusive monopoly of cattle-raising which exists in the islands of Jersey and Alderney; but it is to be hoped that a regard for the general interest of all concerned will induce them to raise the common stock of Nantucket to the highest possible grade. It is for the interest of every farmer to have his stock represent the greatest market value; and if a cow that is one-half or three-quarters Alderney or Ayrshire will sell for one-half or one-third more than a native animal, it is evident that some advantage is to be gained by raising the stock to a higher degree of improvement.

JOSEPH M. FOLGER, *Chairman.*

HORSES.

BERKSHIRE.

From the Report of the Committee.

A stallion, for a stock horse, should possess qualifications of the highest order. He should be sound and without a blemish, of a good, vigorous constitution, resolute style of action, high spirits, and a good degree of nervous or vital energy which gives life to the whole. The great want of the whole country is better horses at more reasonable rates. Now there is nothing to prevent the production of such horses to any required extent; but it cannot be done without labor and money. That we have some specimens which cannot be surpassed, we do not deny; but these, generally, are accidental exceptions and not an established breed, and therefore cannot be reproduced. The great difficulty in producing what is desirable lies in the uncertainty of the animals from which we undertake to breed. To obtain a good product, we must have a good sire and good dam. It is therefore of importance to know not only the antecedents from which we intend breeding, but the antecedents of their ancestors. Although form and general appearance are of very great importance, blood should never be overlooked. The further back the pedigree of both parents can be traced through good specimens, the greater assurance the breeder may have of obtaining what he desires, based upon the established principle that like will produce like. In the examination of breeding mares, regard is very properly paid to her colt, which is required to be exhibited by her side. The same rule ought to apply more forcibly even to stallions. The fitness of a horse for the stud depends much more upon pedigree and unseen qualities, such as a good stock-getter, than upon his outward appearance. Therefore specimens of his stock should be exhibited by his side, to aid committees in the correctness of their decision. To judge accurately in regard to the real merits of a horse, is a difficult matter without the aid of his colts. The dam should be capacious, of good habits, good disposition and good constitution; then breed from none but sound parents, as each inheriting the same excellences will transmit them to their progeny. It is a great mistake (and we might say almost a universal practice with many farmers,) to breed from old, worn-out and unsound dams, with the full conviction that like will get like; yet to realize to their greatest gain, they will argue that they are good for breeding purposes. Hence so many poor, unsound and worthless horses in the country. Soon these same breeders are in a query, and wonder why they do not have better and more perfect colts—why they are so deformed and so liable to this, that and many other diseases—and are ready to exclaim, "The investment in horses is very uncertain;" when, in every nine out of ten cases, the mystery is easily solved, if they would look from what they have bred. Another mistake, is in not being more liberal in the feed of the young, that their fine points may be more fully developed. Not that we would recommend too high and excessive state of feed, but a regular, uniform course in quantity and time, when practicable. Better care and more kindness should be manifested towards them, that they may have more confidence in man, and that we may exert a more healthy influence over their dispositions and make them more what we desire in a horse. We see no reason why the number raised might not be greatly increased, the wants of the people more fully supplied, and, with due care and attention, the quality much improved.

MILES AVERY, *Chairman.*

SHEEP.

MARTHA'S VINEYARD.

From the Report of the Committee.

In the rearing of sheep, as in all other branches of husbandry, the farmer has an especial regard to profit. It is true there are instances where we find fancy farmers paying fancy prices for fancy stock, without having regard to the question of profit and loss, and who, when the balance is found to be on the wrong side, will cheerfully put their hands in their pockets and square the account. But with the class of farmers before whom this report is likely to come, the great idea to be discussed is, How shall sheep husbandry be made the most profitable? In discussing this we will first take into consideration the local conditions which have a direct or an indirect bearing upon the subject. First, proximity to a market. Upon this will, in a great measure, be determined the relative value to the farmer of the strictly mutton sheep, which gives a large per cent. of carcase in excess of wool, or the more strictly wool sheep, which gives a large per cent. of wool in excess of carcase. The farmer who can in a few hours place his fat sheep and lambs in a good market, with the chance of a ready sale, may, no doubt, with profit rear that breed of sheep which will give him the most mutton. Another important condition which affects this view of the case is the character of the farmer's feed, or the capacity of his lands for raising fat mutton. If his feed is not abundant and sweet he need not attempt the producing of fat mutton as a specialty. This condition of feed is also essential in the propagation of the larger breeds of sheep; for large, heavy-feeding animals, kept for a few generations on light, poor pastures, will soon deteriorate, and each successive generation will fall below the preceding, until the stock will show but few points of resemblance to the original.

But it may not be profitable to lengthen this report by considering conditions which do not, as a general rule, exist with the farmers within the limits of this society. We are not in close proximity to a market, and our feed is not very abundant, although what we have is sweet.

Without question the grand idea with our farmers is, From what breed of sheep can we get the most wool, and at the greatest profit on the money and labor expended?

If we were to examine this question at length, and discuss all its various points, we should overstep the proper limits of a report. We will casually glance at only a few leading ideas. Our society in its offers of awards and premiums recognizes only two classes of sheep, the long-woolled and the fine-woolled; —the long-woolled including the Cotswold, Leicester, and their grades, and natives; the fine-woolled including the Merinos and Southdowns, with their grades. The natives not being a distinct breed, we will leave them out in our remarks which are to follow. In the four breeds named we have the four leading breeds of sheep to be found in New England, if not in the country. It is not our purpose to institute close comparisons between these truly excellent breeds of sheep, but simply give a few ideas gathered from observation, and what information we have been able to obtain. The pure Merino is emphatically a fine-woolled sheep, yielding a large fleece of heavy wool, and the farmer who shears a flock of this breed of sheep can boast of a large product of wool in weight. But in this wool we find a large amount of foreign substance, which disappears on the application of the soap and warm water, leaving a proportionate small amount of clean wool for the manufacturer. It is a well-known fact that so long as fine woollen goods continue to be worn so long must fine wool find a market; but it is also a well-established fact that dealers in wool begin to look with care and suspicion upon the heavy, soggy fleeces of pure-blood Merino wool, and ask that a reasonable discount shall be made for dirt.

Our farmers are doubtless honest in their endeavors to rid their Merino fleeces of their yolk and grease by a careful washing of their sheep in cold water; but the yolk and grease of Merino wool do not readily start in cold water. That an enormous weight of fleece has in many instances been taken from Merino sheep none who are acquainted with the facts will deny. Instances of eighteen pounds to the fleece are by no means rare, if we are to credit the published reports of the yield of some small choice flocks; and if this wool can be sold at one-fourth more price than can be obtained for the common grades, then, at first view, this is the breed to which our farmers should turn their attention. But there are drawbacks to rearing this breed of sheep which must be taken into the account. As a breed, their young are very tender, and it is only with the greatest care and pains that they can be reared; and the dams yielding but a very small quantity of milk at first, for the sustenance of their young, renders it still more difficult. A former delegate of this society was in the habit of keeping watch over his flocks almost constantly, day and night, during the time they were dropping their lambs, and as soon as a lamb was born taking it from the mother and nursing it by a fire, kept in his barn for the purpose, and feeding it upon warm milk, and in this way succeeded in rearing most of his lambs. We think if those lambs had been exposed to the keen winds and pitiless storms to which we have seen young and tender lambs exposed, but few of them would have survived.

Of the Southdowns we can only say that they are generally hardy, yet their fleeces, so far as we have seen, are not proportionate to their bodies; and being truly a mutton sheep, they have not, with us, shown those points of excellence for which this breed is so justly celebrated in more favorable localities. They have never, so far as we have observed, shown the large saddle, such as may be seen gracing the stalls in Faneuil Hall Market.

With reference to the long-woolled sheep, we have found the Cotswold to be an excellent breed, standing the rigors of our climate remarkably well, and yielding a large fleece of good clear wool, coarse in texture and strong in fibre. The lambs of this breed are easily reared. It is true we have seen but few of the pure blood, as nearly all we have known of them have been crosses with either the natives or Merinos. Our experience with the Leicester has been limited, but our observation has shown us that they are hardy, and their lambs easily reared, and when mature yield a large fleece of light, open wool, of longer staple than the Cotswold. The latter breeds have more carcase than either the Merino or Southdown.

We have thus sketched briefly the four leading breeds of sheep found in our county, and will now offer a few suggestions in relation to wool.

For years back, up to the time of the war of the rebellion, fine wool was *the* wool in the market. During the war the demand for coarse army goods called for a coarse grade of wool of long staple, and from all the lots coming into the hands of dealers the fleeces possessing these qualities were carefully selected, and a high price obtained for them. At the same time, the demand for the finest grades was good, but the demand for the medium grades was not so good. The two extremes, the long coarse, and the fine, commanded the highest prices. Since the close of the war a demand for another grade of wool has gained the attention of dealers.

For many years the manufacture of worsted goods was principally carried on in Europe, and no attempt was made in this country, or only to a limited extent, to produce goods of this kind. Recently factories for the manufacture of worsted goods have sprung up in different parts of the country, creating a demand for combing wools, and at the present time these are the wools which command the highest prices. The chief characteristics of these wools are a long, moderately fine staple, of strong fibre. To the production of these wools would we call the attention of our farmers, as answering the question first proposed, viz.: From what breed of sheep can we get the most wool, and at the greatest profit on the money and labor expended? With the breeds of sheep we have already named, with our climate and soil, we have the elements necessary to raising the most valuable grade of wool. We suggest that our farmers cross the Merino and Leicester, or the Merino and Cotswold, and by the admixture of these breeds get the open, long, coarse staple of the one, thickened and made finer by the fine, close staple of the other, and thereby produce the true combing wool. And let our farmers be agreed upon this one point, and let the bulk of the wool in the county be of this desirable grade, and the county will be as justly celebrated for the production of the most valuable wool grown, as it now is for the cleanness and beauty of that which it now produces. It has been claimed by some that sheep of such opposite characters as the Cotswold and the Merino do not produce a good stock when crossed; but our observation has led us to believe the contrary of this to be true, for the finest buck we have ever seen in this county was from just such a cross, and we have seen numerous instances where such a cross has produced excellent sheep. Beyond the enhanced value of the wool we have a hardy race of sheep, which stands the rigors of our climate well, does well on our feed, and rears its young without trouble.

We remarked that our farmers should be agreed upon this subject. This concert of action will appear important when we consider that the individual lots of wool in our county are small, and when a dealer makes a price he must make it to correspond with the value of the average of the wool produced, and if the bulk of the wool was of the staple suitable for combing purposes the price would be for combing wool. If one party raise fifty pounds of combing wool, and all the others raise the medium grades, the dealer will hardly recognize so small a quantity; but let all our farmers turn their attention in this direction, and the dealer expects to get a superior grade of wool and pay a price accordingly.

We might offer some suggestions in relation to the care of sheep; but we leave this part of the subject, trusting that our farmers have long since learned the difference in profit of properly caring for and feeding their sheep in winter, and letting them eke out a miserable existence cropping the dead grass of our old fields, and finding a shelter from the wintry blasts under the lee-side of a stone wall.

For the Committee,

DANIEL A. CLEAVELAND.

SWINE.

ESSEX.

From the Report of the Committee.

We have no evidence that any attempt was made to improve the breed of hogs in this country until after the war of the Revolution. In the summer, the young pigs were generally turned into the woods to graze, or later in the fall to feast upon the products of the forest—great hogs from little acorns grew. The winter pens were small, cold structures, with adjacent yards, which have since been well described by Gen. Oliver as "stew of stercoraceous stench—a Serbonian bog of fathomless filth and miasmatic putrescence."

Col. Timothy Pickering was the first Essex farmer, so far as your Committee can learn, who systematically attempted to improve our breed of hogs. Visiting his friend Col. Ridgeley, near Philadelphia, he there saw some of the genuine Woburn breed, descended from a pair which had been sent by the Duke of Bedford, who had introduced them to President Washington, and he obtained a pair for his farm at Wenham. They were white, with more or less small black or red spots, round in the carcase, small-limbed and headed, and for some years they were in great demand.

The superiority of these Woburn or Bedford hogs over the black gaunt breed generally raised, prompted a general improvement of the Essex County porkers, and some valuable crosses were obtained by the ship captains who then sailed from Salem and Newburyport to China and to Africa. Newbury is said to have thus produced a local breed; and we read in a Kennebunk paper of February 17, 1819: "Mr. David Nichols, a worthy member of the Society of Friends, has this day killed a hog, aged 21 months 13 days, half blooded, of the *Newbury Whites*, his girth six feet five inches, unusually short in proportion to his size, weighing with the rough fat 670 pounds precisely, having gained at least one pound per day since he was littered. He was sold for twelve and half cents per pound."

Byfield parish, in the town of Newbury, produced in due time a breed of hogs which was regarded as the best in the country.

The progenitor was a hog, probably brought from China, which was purchased in Newburyport from a ship's cook by a Byfield farmer, and crossed with the "Newbury Whites," and with the Mackay* and Leicester swine, brought by Gorham Parsons, Esq., to his "Fatherland Farm" in Byfield. The pens of the well-arranged and comfortable piggery were always creditably filled, and the food for the inmates was always excellent and well cooked. In 1826, James Ferguson, the foreman of Mr. Parsons, sold at Newburyport thirteen hogs, the weight of which was as follows: 494, 424, 530, 406, 556, 454, 496, 336, 578, 370, 500, 400 and 526 pounds, and two pigs, the weight of which was 211 and 255 pounds, making an aggregate of 6,536 pounds. He only received seven cents a pound, which was then considered a high price for pork, and it is questionable whether he was remunerated for his outlay. But these unprofitable agricultural operations by "gentlemen farmers" are useful lessons to our yeomen, and the Byfield hogs were then and are now unsurpassed in the county.

About 1840 the Suffolk breed of hogs was introduced into the county, by the purchase of imported stock, and we have since had specimens of the Middlesex, the Berkshire and the Essex breeds from England, the Neapolitans from Italy, and the Chester and the Columbia, of native production. But there has not been that care bestowed upon the improvement of our hogs that has been lavished upon our neat cattle, horses, sheep and even poultry. Some of our best farmers either breed from indifferent animals, or purchase pigs from droves; and not only the number but the quality of the hogs of Essex is falling off. Our shows are not now graced by such imperial hogs as that which was once exhibited by Mr. John Alley, 3d, of Lynn, weighing some 1,200 pounds, neither do we enjoy succulent young porkers at our annual repasts. Kerosene has superseded lard oil, or it might be thought that Essex County farmers are *making light* of their hog crop.

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* Captain John Mackay commanded for some years a packet-ship which sailed between Boston and Liverpool. Having a taste for rural pursuits, as is generally the case with seafaring men, the captain bought a farm in Woburn, and stocked it with the best hogs which he could find on the vessels which came to Liverpool from different parts of the globe. When he at last ceased to plough the deep, and devoted himself exclusively to his farm, he gave especial attention to the combination of the several excellences of his best hogs, especially those of the Asiatic race, and by perseverance and judgment he at last produced (just as Robert Bakewell produced the Short-horns,) the "Mackay" breed. For several years Capt. Mackay's hogs took all of the premiums at the Brighton State cattle shows; and Sanford Howard said of them, in 1838, that "for aptitude to fatten, and the attainment of great size at an early age, they are unrivalled by any swine ever known in our country."

Ben Perley Poore, *Chairman.*

BRISTOL CENTRAL.

From the Report of the Committee.

Perhaps no branch of agricultural interest is more neglected than this, on account of the general impression that it is a profitless pursuit, only so far as the wants of the family are concerned. Farmers are not so particular to get a good breed of hogs as they should be. Almost any pig that goes on four legs, has a long nose, legs like a sheep, and can squeal well, is regarded good for pork-making purposes. The consequence is, little attention is given to the breed of pigs kept or the manner of keeping them, only so far as to give them the least possible attention. There are a number of breeds, and each one has its admirers and advocates; but we are satisfied that a hog with good points, be the breed what it may, seldom fails of paying well for his corn. It cannot have failed of being noticed that a hog with a short nose, small head, fine bone, full hams and shoulders, wide between the eyes, is all right everywhere else and is an easy and quiet feeder.

I have found the genuine Chester County pig to be as good as any I have ever seen, their size, docility and aptitude to fatten at any age being remarkable; but many are sold under that name that have not a drop of the pure blood in them. Many are bred from too early, before they have arrived at maturity, thus diminishing their size, lessening their vitality. No sow should have her first litter before she is one year old, and no boar should be used before he is nine months old, and then very sparingly. This would give them a chance to arrive at maturity, be more fully developed, and their offspring be much more vigorous. They should have a clean, dry, airy place to sleep in, and if allowed the run of a grass lot or an old orchard so much the better for them and their owner. With such treatment, I have had pigs which at eight weeks old weighed 50 to 65 pounds, and heard of some owned by a friend, which were raised by L. B. Silver, of Salem, Ohio, which at eight weeks old, after a three days' journey in the cars, weighed 85 pounds, and one at nine weeks old weighed 100 pounds. I have a boar pig from the same gentleman, which at sixteen weeks old weighs 150 pounds, and whose sire at eighteen months old weighed 1,000 pounds. Mr. Silver's reputation as a successful stock-breeder has become fully established, owing to the fact that he pays particular attention to the business, selecting only the best to be had for breeders, and by his desire to give satisfaction to his customers and insuring the safe arrival of all stock ordered of him.

Our most successful breeders of stock of any kind are those who in the first place purchase the best of either cattle, horses, sheep, swine or fowl that can be obtained; in the next they give them the best of shelter, food and care; and these men are always successful and make it a profitable business. And just in proportion as you vary from these points will it be a profit or loss in breeding any kind of stock. The one who makes a profit is the one who gives the best care and attention to his stock; the one who finds it an expense is the one who lets them take care of themselves.

J. T. TILLINGHAST, *Chairman.*

POULTRY.

ESSEX.

HOW TO MANAGE THE HENCOOP.

Essay by Gilbert L. Streeter, of Salem.

It is the purpose of the following essay to furnish, in a concise form, information concerning the details of managing the hencoop and poultry-yard. The books upon this subject are so burdened with useless, uninteresting and unreliable matter that their value is diminished in about the same proportion that their bulk is increased.

Whether fowls are kept for pleasure or profit, it is alike important that they be properly cared for. The same conditions of health and vigor which cause fowls to lay well, to breed successfully, and to grow fat, also promote the symmetrical development of their bodies and preserve the freshness and beauty of their plumage. Probably fowls are usually kept for pleasure and profit both, for show as well as for use. The care of the flock is one of the little gratifications of the farmer's family; and it is perhaps even a more agreeable task to the "dusty citizen," longing for the pleasure of rural pursuits, who rears his choice breeds as a slight indulgence of his taste for country life. The pleasure thus derived is justly considered as one of the advantages of keeping fowls, to be added to the net gains of eggs and chickens.

But the chief motive of the poultry-raiser is the pecuniary profit to be derived from it, and without this stimulant we may be pretty sure that the hen-house would be far less popular than the dove-cot, the bird-cage, or the dog-kennel. But with care and attention the raising of poultry may undoubtedly be made to pay as well as most investments of this nature, and perhaps better than most of the incidental pursuits of farming; and without care and attention neither this nor any other pursuit can be followed with success. There are no very accurate statistics upon this subject, but a comparison of numerous statements which have been published in agricultural reports and newspapers warrants the estimate that a flock of hens, under economical management, will yield an annual profit of from one to two dollars each. Doubtless a few choice hens, properly kept and carefully nursed, will yield a larger relative income than a great flock kept indifferently well. Of course such gains cannot be made upon fowls bought at fancy prices, such as prevail during "hen manias." Those who, fifteen or twenty years ago or more, paid from $25 to $50 a pair for the enormous and ungainly birds then imported from foreign stocks did not look for remuneration; nor do those who to-day pay absurd prices for Crevecœurs or Houdans. In 1854, at an auction sale in England, a single Spanish hen brought $55, and a lemon-colored hen $77, and a cock weighing thirteen pounds brought $215; but these foolish purchases were not made for profit, but to gratify a whimsical excitement.

QUALITY OF STOCK.

Our American poultry has been greatly improved within a few years by the general introduction and extensive intermixture of the larger Asiatic breeds. Not profitable in themselves, the Indian and Chinese varieties, by crossing with our common fowls, produce what experience has proved to be the best stocks for our own country. The Shanghaes and Chittagongs, Cochin Chinas, and other gigantic and awkward birds, have justly fallen into disrepute. They are monstrous eaters, and their flesh, besides costing more, is coarse and strong in flavor. Although their eggs are large, they are considered to be of inferior character. The eggs of the large breeds have often pale yolks, and it is contended that the highest colored yolks, which are usually found in the smaller eggs, have the finest taste. It is an admitted fact that the eggs of the Bantam hen, the smallest of all, are of unequalled delicacy.

But the commingling of the strong foreign blood with our domestic stocks has tended to hasten the maturity of our fowls, to increase their size and weight at a given age, and to increase the number and size of their eggs. It is estimated that chickens derived from a crossing of the Asiatic and American bloods will, with proper care, begin to lay in four and a half or five months, on an average, and that the cocks will at that time give a dressed weight of from five to six pounds. The weight of the Asiatic breeds at maturity is usually, of cocks, from ten to thirteen pounds, and the hens about two pounds lighter.

SELECT VARIETIES.

When select varieties of fowls are kept it is a good plan to have at least two breeds, one to lay and the other to sit; for those hens which lay abundantly are not in general disposed to sit well. The "everlasting layers" are not at all broody, and cannot be relied upon either to hatch or rear chickens. On the other hand, those that are much inclined to sit, and consequently confine themselves closely to the eggs, and prove good mothers, are not the most prolific layers.

For *laying hens* there is no breed superior to the Black Spanish. They lay abundantly, and produce a very large egg, while the fowl itself is of medium size and not a great eater. Their eggs will weigh from two and a half to three ounces each, and they will lay a greater weight of eggs annually than any other fowl, unless it be the Leghorns. The White-Faced Spanish is the purest variety. It has a clear white face, a full breast, large single, serrated comb, long pendant wattles, (apt to freeze in winter,) and beautiful black plumage, and is an attractive bird. Mr. Richardson, author of an English work on "Domestic Poultry," says, "The Spanish is one of the very best birds with which I am acquainted. It possesses flesh of the best and whitest quality, and acquires it with rapidity, which is a most important consideration to the producer; and the hen lays a large egg."

The Black Spanish is very popular in England, where it is known as the "gentleman's fowl." It has acquired an equal reputation in this country, as an early and everlasting layer, early maturing, seldom or never desiring to sit, and usually healthy. The objection to this fowl is that its wandering and fly-away propensities render it annoying in a neighborhood.

For *sitting* the common native fowl may be recommended, or the Brahma Pootra. The latter is a very broody bird and sits remarkably well, but, being clumsy, must be looked after when the chickens hatch, lest she crush them with her feet. The Brahma Pootra is also popular as a good layer, producing a large egg about the size of the Black Spanish, and of the yellowish hue common to eggs of the Asiatic breeds. The flesh of this bird is good also. Although large, it is not gigantic in size, nor is it awkward in appearance. It matures slowly, and unless forced the chickens will not lay in less than eight or nine months. It is a great eater, but will accept any kind of food. It does not incline to fly, nor to wander abroad, nor to scratch much, and it is therefore a good breed to keep in enclosures in town. The color of this fowl is white, with a mottled neck; its comb and wattles are small, and it is hardy and able-bodied. This variety is at the present time more popular than any other, and perhaps deservedly so. One great merit of the Brahmas is their peaceful disposition—an entire absence of pugnacity.

The Dorkings both lay well and sit well, and, where only a single kind is desired, can be recommended. The pure variety is speckled. Its name is derived from a town in Surrey, in England, and in that country it is considered the best of fowls.

It is plump-bodied, large, white-fleshed, matures early, and lays large eggs abundantly, although in this respect it is not equal to the Spanish. And it may be here stated that the Dorking and the Spanish make a good cross.

The Bolton Gray has enjoyed some reputation as a laying hen, although the eggs are small, and they mature slowly. But it has an odd habit of dying suddenly, without any apparent cause, and for this reason it cannot be recommended. "You go into the coop," says Mr. J. J. H. Gregory, "and find one of your finest fowls on the nest for two or three days in succession, with a comb rather unusually red (now this redness of the comb is a certificate presented by other fowls that their internal egg-producing apparatus is in full working order;) and you tell John that 'really that Bolton Gray hen does beat all in the poultry line that was ever heard of, seen or read of; indeed you more than half believe she is but a mass of eggs slightly covered with feathers.' John, filled with respectful admiration, approaches the prodigy with stealthy steps, looks closely, and—proclaims her dead!" This has been our own experience.

The Bantam, although the smallest of breeds, is pleasant to keep, on account of its smart, gay and sprightly habits. The best variety, Golden Sebright, is named after Sir John Sebright, an English fowl-fancier. The Bantam will often weigh not over one pound. A six months' old Bantam hen was exhibited at the Essex fair, in 1860, which weighed only six ounces. These little birds lay well and sit well. Their eggs are delicate, and weigh from ten to fifteen to the pound. At a show in London, in 1847, five Bantams sold for about $250, or $50 each! The breed is of Asiatic origin.

The Leghorn fowls, in their general characteristics, are almost precisely like the Black Spanish, and some maintain that they are an accidental variety of that sort. They are clear white, with beautiful pendant wattles, large serrated comb, of spirited bearing and handsome carriage, shy, wild, hardy. They are unsurpassed layers; they do not incline to sit until the second or third year; they mature early, commencing to lay in four or five months. Their young are hardy, and advance with rapidity. The flesh of the Leghorn is white and excellent, but the bird is only of medium size, and not profitable to raise for market.

The Leghorn requires pretty warm quarters in winter to save its comb and wattles from freezing, and causes trouble by its nervous restlessness. Apart from these peculiarities, we know of no better fowl to keep.

Of the new French fowls now so much sought after by amateurs, without regard to cost, we have had no experience. It is said that La Fleche, Le Crevecœur, and the Houdan, are wonderful layers, besides being in all other respects excellent. How they may develop their qualities in this country will soon be determined by experiment. Meanwhile we have only noticed the leading varieties of established reputation in this vicinity.

THE COOP OR HENERY.

The thing of first importance to be attended to in the keeping of fowls is to have a suitable house for their accommodation. However much care may be taken in the rearing and feeding of fowls, the results may be wholly unsatisfactory unless the coop is convenient and comfortable. And the general conditions of convenience and comfort can be complied with in a common, cheap coop, nearly as well as in an expensive henery.

In the first place, the hen-house should be *dry*. It should be warm and dry in winter, and cool and dry in summer. There should be no standing water or wet places in the coop, or anything to occasion much moisture, like sink-drains or emptyings. It is very injurious to fowls to get a wet chill. Even the cold of winter, when dry, is less prejudicial to their health than dampness in warmer weather. They should not be exposed to long summer rains, but should have a ready shelter from such exposures.

It is well to have an enclosure where the fowls can scratch in the gravel, and a hen-house (with a floor) connected with it which they can enter at night or in stormy weather. This house should contain large windows or glass sides to admit the sun in winter, and it will be better if it can face the south and be protected on the cold side by some other building or warm structure.

But if this henery should be warm in winter, it also should not be too warm in summer. It is therefore necessary to have some simple means of ventilation, and this should be at the top if possible. Drafts of air across the hen-house should be avoided, as they are injurious to the birds.

The hen-house should be kept clean always, and, if possible, sweet. All stinks are unwholesome to fowls, and it is not good for them to roost over accumulations of their own excrement. It is a good plan to place under their roosts, say two feet down, a gutter made of two boards, each six or seven inches wide, and nailed together at the edges. The excrement will lodge here, and may be scraped out every day or two, dried in the sun, and then put into a barrel for sale. If the dung is put in a barrel fresh it becomes offensive, and in warm weather maggoty. The hen-house should be frequently and thoroughly whitewashed, to keep off and destroy lice. This is indispensable.

The roosts should be made rather large, and somewhat rough to help the grasp of the fowls. Poles covered with the bark are good. The heavier and more clumsy birds, like the Brahma Pootra variety, like to roost on a board, say four inches wide, and not over eighteen inches from the floor. The lighter and more active sorts will go as high as they can get. But there should be small ladders, or boards with cleats, for the fowls to walk up on, as in flying high they are apt to fall and break their eggs or do other injury.

The nests should be low and approachable by similar easy steps, and so constructed that the hens shall not need to fly down roughly upon the eggs, with danger of breaking them, but be able to step on easily. Common square boxes serve very well as nests, and there should be three or four to each half-dozen laying hens. The surface of the hay in the nests should be as high as it can be without danger of the eggs rolling out, and should be concealed from view as much as possible. For sitting hens it is well to place dry earth in the bottom of the nests, below the hay. The earth serves to keep an equable temperature, and the little moisture arising from it seems to be favorable to the process of hatching.

Fowls should always have a place to scratch in; and in absence of a better provision for this purpose, a box of earth, fine sand or wood-ashes may be placed in the coop and frequently renewed. For the convenience of access, all parts of the coop should be easily approachable, so that it may not suffer from the want of frequent and proper cleanings.

However large a henery may be, it is recommended that the various apartments should be of moderate size, and it is a good plan to provide separate quarters for each variety of fowl. This will preserve the purity of the breeds, and, as small coops are thought to be favorable to the hens' laying, it may be economical also. In winter a good many hens may be kept in a small place, with the advantage of comfort caused by the animal heat of their bodies, provided that the atmosphere be not contaminated by offensive accumulations of dung.

FOOD.

The appetite of fowls is so nearly omniverous, and their usual food so well known, that not much description is necessary. In general they are fond of all sorts of grain, most of the wild and succulent vegetables, insects and worms of nearly all kinds, and flesh, both raw and cooked, not excepting the flesh of their own kind.

Oats, corn, barley, buckwheat, rye, millet, rice, sunflower seeds, and many other varieties, are readily devoured, although with different degrees of fondness. Careful experiments have shown that as to bulk or measure there is not much difference in the daily consumption of grains, and it is therefore best to provide those sorts which are cheapest, taking care to furnish a suitable variety. The kinds which the fowls may prefer—for tastes differ among the biddies as well as among humans—will be best determined by experiment. Good economists find that grain food goes further when boiled, except oats, buckwheat and rye, which are not much swelled by cooking. Sunflower seeds are said to be particularly good for fattening. Corn is composed largely of starch, which is a fat-producing element, and is deficient in the nitrogenous substances of which eggs are made; hence hens fed too much on corn lay on fat, but do not yield eggs. Oats and animal food, on the other hand, yield the egg-forming materials, and will promote laying, but will not fatten. A laying hen of course should not be fat.

Of green vegetable foods, the leaves of cabbage, lettuce and spinage are preferred; but in the season of grass and chickweed, there is nothing better than these. Boiled potatoes, mashed and given warm, are an excellent stimulant, and much used by the French poulterers in fattening. Potatoes mixed with Indian meal we have found to be good, and all the bits of bread, boiled vegetables, &c., from the kitchen are acceptable.

GIVE MEAT.

The avidity with which poultry devour worms and insects is a matter of common observation. Mr. Reaumur, the distinguished French experimenter, fed a hen entirely on worms for a fortnight, and she seemed pleased with her fare and grew fat. At first she ate a pint a day, then increased to a quart, and then to nearly three pints. In the winter, or when the fowls are confined, and such food cannot be had, they should be supplied with bits of meat, fish or fat, to supply the drain on their system of constant laying. They will eat meat, either raw or cooked, without much preference. Fresh fish scalded may be easily cut up for their use, and will be eagerly eaten. They are fond of blood, and when a companion is wounded will peck at the wound to procure the blood, and even when wounded themselves will drink their own blood, if they can reach it.

All *salted* food should be carefully avoided, and also the throwing of bits of salt from the table into the coop, which may prove fatal, and is a frequent cause of sickness.

FEED CONSTANTLY.

The crop and stomach of poultry are so formed that it will answer to feed them once, twice, or three times a day; but it is better to keep food before them *all the time.* They should at all events have a chance to fill their crops *before going to roost for the night.* If food, say a mixture of oats, barley and corn, is kept before them all the time, in a feeder so contrived that they cannot waste it, they will not eat much in the early part of the day, but will fill their crops just at night. Fowls are not such greedy eaters as might be supposed by any one who should see them fed only occasionally. An English writer estimates that a common-sized fowl will eat a quarter of a pint of oats or barley a day, and voracious fowls of large size a third of a pint.

LAYING.

To promote laying, in the winter season, an abundance of warm, stimulating food should be furnished, in good variety. The fowls should have constant access to gravel to promote digestion; to fine sand, in which to cleanse themselves and remove lice; and to old mortar, lime, pulverized oyster or clam-shells, ground bone or chalk, to furnish the material which aids in the formation of egg-shells. These things may be kept in boxes if necessary.

Water should be always handy, for fowls frequently suffer from the want of it. If it can be so managed in winter that the fowls shall not dip their gills in it, those parts may be saved from freezing while wet. The lack of clean and fresh water, in connection with too constant feeding on grain, causes costiveness, and, in such cases, water, warm vegetables and meat may be given as correctives.

To promote good laying, there must be careful feeding, amounting almost to nursing of the flock.

Hens lay a larger number of eggs during the first two years than ever afterward, and from the second year steadily decline. Cocks reach their greatest vigor in their second year, and careful breeders change their male birds every season, the time of moulting being chosen to separate the old ones and introduce the new-comer.

SOFT EGGS.

When soft-shelled eggs are laid, it indicates too high feeding, too much meat, and an insufficiency of lime; and, as a remedy, the quantity of stimulating food should be diminished, which will usually be effectual. But if the trouble continues, a little chalk may be mixed with their water, and some recommend a little brick-dust in their food. The want of materials for the proper formation of shells sometimes causes abortion, and results in the death of the hen while laying. The liability to this is increased by eating too much meat.

HOW MANY HENS TO KEEP.

We know of no method of determining the number of fowls that may be kept with profit. This must depend upon the extent of your accommodations, the range which can be given them in summer, and the amount of waste food which can be furnished by the family or otherwise, without the cost of buying.

The number of hens to be kept with one cock is a matter of considerable difference of opinion. Some recommend as many as twenty or twenty-five, which is the practice of poulterers in the warm climate of France. But this is too large a number for this country.

If the purpose is to breed strong and healthy chickens, a less number of hens should attend a single cock than when the production of eggs is the sole object, without regard to breeding. Our experience would lead us to recommend that for the rearing of strong chickens, from four to five hens to a cock is enough, while for the production of eggs the number may be increased to ten or twelve.

Hens will lay unattended by a cock, and unimpregnated eggs have this advantage, that they will keep fresh for a much longer time than those which contain a germ. But hens unattended will lay a less number of eggs, and with irregularity and uncertainty.

SITTING.

The selection of eggs for sitting requires much care if you wish to insure the best results. The freshest eggs should be preferred, for it is much better to keep the hen waiting for the eggs than the eggs waiting for her. Those from a pullet, from one to two years old, matched with a cock of two or three years, will be the surest to produce strong chickens. If the eggs are too old, the chickens may not have strength enough to get out of the shell, or if they do, will be feeble, and likely to be trodden on and killed by the hen. One test of eggs is to put them in a bowl of tepid water, and those that do not sink to the bottom should be rejected.

In about five days after the hen commences her sitting, it is well to examine the eggs in order to see whether they are all good. By holding the egg between the thumb and finger and looking through it at a strong light, some will be seen to be semi-transparent. Such eggs contain no germ, and will not produce a chicken. They are not spoiled, however, for it is a curious fact that these unimpregnated eggs resist corrupting influences for a much longer time than those which are fertile. They may therefore be taken out of the nest and used in the family.

THE NEST.

The nest for a sitting hen should be made flat, like a plate, and not hollowing and deep, for there is danger that she may step down upon the eggs and break them, or may crush the chickens as they hatch. It is well, as we have said, to put a little earth below the hay, as it tends to preserve a regular temperature and seems to exert a favorable influence upon the shell.

If an egg is accidently broken it should be removed, and if the others have been soiled they may be carefully washed in warm water; but this must be done with extreme tenderness, so as not to jar the egg.

Food and fresh water should always be kept near the nest of a sitting hen, lest she should stay away from the eggs too long when she comes off for food, or, on the other hand, should sit too long at a time for the want of food where it will be handy. A box of earth for her to scratch in should also be near by.

BROODING.

Some hens will sit so closely that it is necessary to take them off by hand, which may usually be done, in a quiet and cautious manner. We have found no difficulty in handling hens in this manner, and it is a practice which promotes their health and vigor.

It is impossible to have much success with the hatching of chickens unless some care is taken to have everything in and about the nest and its patient occupant in proper condition. There must be more or less nursing, especially when the chickens begin to come out.

With suitable treatment chickens may be successfully raised from the first of March until August. Before this period a nest of eggs and a brood of chickens causes too much trouble and expense, and after July cool weather comes too soon for the endurance of a brood raised at that time.

SEX OF EGGS.

Some writers have undertaken to determine the sex of eggs, which would certainly be a great gain to the fowl-fancier, as he might then fix the proportion of his laying hens before incubation. But all indications are uncertain and not to be relied upon. M. Genin, in an address before a scientific society in Paris, states that eggs containing a male germ are of elongated form, with a partially raised or ringed surface around the small end of the shell, while the female germ is smooth and more equally of a size at both ends. As a matter of curiosity, it is well enough to test this rule by experiments.

HATCHING.

The chickens should hatch in due course on the twenty-first day, and the nest should receive a good deal of attention about that time. The state of the weather often makes some difference in the time when the chicks break out of the shell. The duration of the process is also variable. Some chicks will disencumber themselves of the shell in one hour, and others in two or three hours; but it is generally a pretty good half-day's work.

Ears accustomed to this operation readily detect the approaching birth of the chicken by his "gently tapping, tapping at the door" of his cell to break the first little hole. Sometimes the shell is too tough and the occupant needs to be helped out. If the chick stops its efforts to get out for five or six hours it is well to liberate it by breaking the shell. This must be done very carefully, first by making a small circular fracture, such as the chick makes, and then replacing the egg under the hen. If this does not answer, and the chick adheres to the shell within, the shell must be delicately broken, and, by the use of a linen rag, wet in warm water, the chicken must be disengaged, or unglued, from the pieces of shell to which its feathers are sticking, by dissolving the glutinous substance which confines them.

THE CHICKENS.

We have found it best, with some hens, to remove the chickens as soon as they are hatched and place them in wool in a warm place, rather than to risk their being crushed by the hen. They need no food for several hours, say twenty-four. It is very necessary to keep them dry and warm, and they may be buried in wool for this purpose. It is well also to keep the hen away from the earth for several days, until the chickens gain strength enough to keep from under her feet when she moves or scratches. They should be provided with fresh water in pans so arranged that they shall not get wet; nor should they be exposed to the rain, nor permitted to wander in wet grass; for it must be remembered that nearly all the diseases of gallinaceous fowls arise from cold and moisture. The first food of the chicks may be bits of soft bread, Indian meal and oatmeal mixed, hard-boiled egg chopped fine, soft-boiled potatoes, and by and by cracked corn. Too much watery food should be avoided. Some poulterers think that Indian meal dough is too cold and indigestible for young chicks.

When the hen goes to roost and weans her brood they will generally go with her. If they do not, they should be put with chickens of their own size until they are old enough to roost. But it may be noticed that when large and small chickens are mixed the former are apt to crowd the latter away from their food and otherwise to abuse them.

DISEASES.

The diseases of fowls are obscure in their character, and very little that is satisfactory can be said upon this point. It is much easier to prevent disease in fowls than to cure it. Most of their troubles seem to originate in damp and cold exposures and improper diet. Therefore to keep fowls in health they should be provided with clean and well-ventilated houses, free from cold, damp drafts; they should be regularly fed with a variety of things, and should be constantly supplied with water and gravel. But in spite of all care they will sometimes mope, sicken and die. When a fowl shows signs of sickness it should be immediately set apart by itself to avoid contagion, to save it from being picked by the well ones and to apply remedies. Oftentimes cures can be effected by placing sick hens in the sun or near a stove in the house, for heat seems to be one of the sovereign remedies in the gallinaceous kingdom. If more than this is necessary, there is no other way than either to kill the fowl forthwith, or to look for its symptoms in some book upon the subject, and apply the remedies there indicated.

MIDDLESEX SOUTH.

Statement of George W. Chadwick.

I present you the following statement of the method, expense and profit of keeping fowls for one year. The fowls which I offer for premium are Brahma and Hamburgs. I had a stock of eight hens and one rooster.

KEEPING.

I let my fowls run at large both summer and winter. I never coop them up, not even when they have chickens. I think they do much better to run at large. I feed twice a day in winter; in summer once. They have a variety of food—corn, Indian meal, oats, buckwheat, barley, with some meat and some raw vegetable substance, often, in the winter. Two of them had broods, and I have raised twenty-one chickens. For fattening I used clear corn and oatmeal. My chickens at four months old weighed five pounds per pair, at average value of thirty-three cents per pound. The flock has laid ninety-three dozen of eggs.

Cost of keeping eight hens and one rooster:—

Corn and Indian meal,		$10 00
Buckwheat and barley,		8 50
Oats, meat and vegetables,		5 50
		$24 00
93 dozen eggs, market price,	$27 90	
Chickens,	15 00	
		42 90
Profit,		$18 90

Statement of S. B. Bird.

The following statement of the expense, income and method of keeping my fowls is for six months, from March 20 to September 20. Average number, fourteen; a cross of the White Leghorn and native breed. I feed with corn, barley and oats, changing every few days, as fowls are fond of a variety of food; also supply them with lime, pounded bones, scraps, and occasionally with fresh meat. By feeding in this way I not only get a liberal supply of eggs, but the fowls are in good condition for the market at any time.

153 dozen eggs, at an average price of 35 cents,	$53 55
28 chickens, at market price,	28 00
	$81 55

Cost of keeping:—

14 bushels grain,	$16 75	
Scraps and meat,	2 00	
		$18 75
Net profit,		$62 80

FRAMINGHAM, September 22, 1868.

Statement of Lewis Jones.

The following statement covers a period of eight months, from January 1, 1868, to September 1. Number of hens kept, twenty-four; mostly Leghorns. I think they are much the most profitable fowls kept. Number of eggs laid by the twenty-four hens in eight months, 230$\frac{2}{3}$ dozens.

EXPENSES.

24 bushels of corn,	$30 00
3 bushels of cracked corn,	3 75
Scraps,	1 25
	$35 00

PROFITS.

224$\frac{1}{3}$ dozen sold, average about 37 cents per dozen,	$82 67
Set 6$\frac{1}{3}$ dozen, raised 53 chickens, sold at market 25,	18 75
Chickens on hand, 28,	28 00
	$129 42
	35 00
Net profit of 24 hens, eight months,	$94 42
Net profit per fowl, eight months,	3 93

KEEPING.

I never coop my fowls up. I have fed my fowls the past year mostly on whole corn, feeding them generally three times a day. I keep a plenty of clean water for them to drink when they want. I have used this year cracked corn for my chickens. I give it to them dry. In the winter I cut up turnips when I have leisure, and feed them with it. I likewise give them cabbages. I also give them refuse meat cut up, and sometimes scraps; likewise oyster shells pounded up, and when I can get old plastering I pound that up with the oyster shells. Fowls kept in this manner are always ready for market, and in condition to lay as well in the winter as they are in the summer.

WAYLAND, September 1, 1868.

BRISTOL CENTRAL.

From the Report of the Committee.

There is evidently a much nicer discrimination in the selection of breeds, as is evident from the greater proportion of the valuable varieties of pure-blooded fowl over the mixed and comparatively worthless races which predominated a few years since at our annual festivals. The Leghorns, Black Spanish and Hamburg varieties, all of them valuable for their laying qualities, seem to have the preference over the old Asiatic varieties, for which there was such a popular rage a few years since, the Brahma Pootras being the only variety which has deservedly survived the short-lived glory of the race.

Our farmers are beginning to understand that while weight and size are of some importance, it will not do to sacrifice to these other more useful qualities. We are aware that too many agriculturists ignore to a great extent the question of distinct breeds in poultry, and regard the subject as too unimportant to merit any considerable attention. Such do not imagine, perhaps, how much they are indebted to the poultry-fancier for the excellence even of such breeds as they possess.

The same principles which apply to the raising of other farm stock are applicable here; and it will be found, generally, in a series of years, that no other part of the annual yield of the farm will equal this in point of profit proportionably to the sum invested, where there is careful and judicious management.

Let us briefly consider a few principal points in the good breeds of poultry. It has been universally admitted, we believe, by poultry-fanciers and breeders of distinction, that the nearer a fowl approaches to the partridge in form, the better adapted it will be for the table, because that bird has more meat on the breast in proportion to its weight than any of our domestic poultry, the turkey excepted. Tried by this test, let us examine a few of the principal breeds. Let us take the Asiatic variety, and we observe a want of compactness in their shape. Their legs are long and their thighs full and heavy, while there is little fulness to the breast. They will be found to have less white meat than any other in proportion to their weight. Taking the Dorking next, we find here nearly the true ideal; the legs short and breast very full, while the size is as great as is compatible with activity. The hens weigh six to eight, and cocks eight to twelve pounds.

The Leghorns, Hamburgs, Polands, and their congeners, are deficient in size, the Hamburgs being the best for the table because the largest. The Games, perhaps, come as near to the true ideal as any, the flesh being particularly compact, and the large varieties weighing from five to six pounds each. The Dominiques are an excellent breed for the farmer, combining some of the best points with respectable size. If eggs only are desired, the Leghorns or Black Spanish will probably be more profitable than other breeds—provided, always, that their roosting-place in winter is a warm one. The immense size of the combs in the males is an objection. Unless unusual care is taken they will certainly freeze these more or less in winter. We would advise farmers who prefer to keep this breed to cut the combs of the young cocks late in the fall, which will be an effectual preventive against freezing. If combs are frozen during the winter, the fowls so affected are drooping and sickly in the spring.

The Brahma Pootra fowl is a profitable one in some localities, though deficient in fulness of the breast and too high on the legs. The Gray Dorking is a capital cross with these, though we should prefer the full-blooded Dorking to any other, except where very early spring chickens are desired. It is a very common recommendation of the Brahma Pootras that "they will not fly to any extent," that "a very low fence will keep them in," &c., &c. While this may commend them to those who live in our cities and towns, it may well be doubted whether this is a favorable consideration for the farmer. It is the active races of fowls which will almost get their own living in summer, so to speak, which will be the most profitable for the farmer. The amount of slugs, caterpillars and grasshoppers which these will destroy in a season is much greater than will be destroyed by a sluggish race like the Brahma Pootras. Consequently, the amount of grain consumed by the latter will be greater than in the case of the smaller and more active breeds. There is one characteristic which, however, is greatly in their favor, which is that they are peculiarly hardy. There is no race which will thrive better, even when hatched very late, through our cold winters than these. They should be killed when they are two or three years old at most, as after that time they want to sit too often, and cannot easily be broken up.

We were sorry not to observe any specimens of the Dorking breed, which in England, where it is known, takes the very first rank at the annual poultry exhibitions in November. It has more white meat on the breast than any other variety, and commands the highest prices in the London markets. The Game, too, is a highly valuable breed, very hardy, which we should have been glad to see represented. It is a valuable cross in any yard where full-bloods are not desired. We were pleased to see a coop of Houdan fowls, brought by Isaac Dean, of Taunton, being the first of the kind exhibited on these grounds. They are beautiful birds, and, if sufficiently hardy, will, no doubt, make a valuable addition to the desirable breeds already enumerated. Their reputation is very high in France, but the price asked by fanciers is too high to place them within reach of farmers generally.

EDMUND RODMAN, *Chairman.*

MARSHFIELD.

Statement of M. S. Ames.

On hand May 1, 1868 :—

40 hens 2 cocks, worth 60 cents each,	$25 20
32 chicks, one to three weeks old, 10 cents each,	3 20
Have bought or used 285 hen's eggs,	5 85
Have bought or used 20 turkey's eggs,	1 33
Grain to the amount of	42 73
Total,	$78 31

CR.

They have laid 148½ doz. eggs, amounting to	$40 56
I have sold 20 old fowls, 66¾ lbs.,	11 94
I have sold 47 chickens, 136¼ lbs.,	23 01
Total,	$75 51

On hand October 1, 1868:—

18 old fowls, at 50 cents,	$10 80
11 Brahma pullets, average five lbs., 20 cts.,	11 80
50 chickens, average $2\frac{1}{2}$ lbs., at at 29 cts.,	25 00
48 chickens, average $1\frac{1}{4}$ lbs., at 20 cts.,	12 00
5 turkeys, average 21 lbs., at 25 cts.,	5 00
Total,	$140 11
	78 31
Net profit in five months,	$61 80

I kept through last winter fowls mostly of Black Spanish or Leghorn breeds, or a cross between the two; consequently I bought eggs for early chickens, and set the eggs of my own fowls for store chicks. I had very bad luck with my early chicks by eggs not hatching well. Later ones did better, but not much, and I did not get half as many chicks as I set eggs; then cats, hawks, &c., thinned them out severely. One litter of turkeys died young, and foxes took off two more after they would weigh five pounds each. Then two old hens stole their nests and began sitting, and I never found the nest or the hens. Foxes probably ate them. Two other hens died of disease.

I usually keep food by them all the time, occasionally changing from corn to dough, oats or barley, if I can get it. Keep fresh water by them all the time in summer; in winter give it to them two or three times a day, warming it very little in very cold weather. Feed with sour milk whenever I have it; in winter give meat scraps, boiled potatoes, cabbage leaves, &c., as often as I can. Keep shells by them all the time. When my hens, or most of them, stop laying at once, I allowance them to one quart of grain, or its amount per day, for ten or twelve hens, to keep them from taking on too much fat. Laying hens will not fat much if laying well. I always keep good ashes where they can dust in them, and give clean nests occasionally. The hen-house should be kept clean. The best way is to keep loam under the roosts, and turn it over, or put in new every week or two; it is well to whitewash the hen-house two or three times a year. Don't keep hens over four years old. Don't sell a laying hen, but wait till she lays her litter out and is ready to sit; then she is the fattest, and the eggs more than pay cost of her keeping and any fall in price. I sometimes sell old hens when they get through sitting, if I can put their chickens under another hen; but I don't like to unless late in the season and they are too old to winter. The hen-house in winter should be warm, open to the south, and have a sheltered "scratching place" near. Good hens can be made to pay three dollars per year over their keeping. I give no credit for manure, but I let that and the convenience of having fresh eggs or chickens when wanted balance the labor. I charge no interest, as in five months they pay it faster than it comes due.

DAIRY PRODUCTS.

MIDDLESEX NORTH.

From the Report of the Committee.

We regret to say that we did not find a larger number of competitors for the society's premiums; for we cannot understand why all good dairy women should not only feel a strong desire to present the best results of their honorable calling, but should possess a conscious pride in exhibiting the rich and beautiful fruits of their industry, and thus directly promote the best interests of the association to which by right and privilege they belong. For here, especially, numbers indicate interest and have their weight of influence; so that instead of finding only eight entries, we should have been glad to have found at least three times eight—not that any more could have received honorable mention from the society, but all could have the satisfaction of declaring to the appreciating multitude their own personal merits as housekeepers, for it is true in all things that "work reveals character." Besides, we hold that no one should be afraid or ashamed to exhibit the best specimen of his or her handiwork, though it may not equal that of others. If he has any *heart* in his work, by comparing it with others he may get the information and incentive that will enable him to excel in the future. So we would say to all farmers and their wives, all men and maidens engaged in agriculture,—the noble service,—to bring to your exhibition the required product of your dairies which entitles you to the society's premium, and if your work is most worthy you will secure the highest; but if not, bring it, that you may thus testify to the worthiness of your occupation and your interest in the society's welfare.

But in examining the statements of the several contributors we must confess that we were somewhat disappointed in the meagreness of the information they contained regarding the entire process the author pursued to secure generally such excellent results. Now, when good butter is the exception and that ordinary and poor is the rule, we believe it is of some consequence, both to producer and consumer, to know exactly how these results are accomplished; for it is a matter of prime importance, and one all ought to know, whether good butter is the inherent merit of the cow, her food, or the manner it is produced and the care it receives. With only two exceptions, no mention is made of the class or breed of cows from which the butter was made, and these were native. In none is any allusion made to the quality of the food fed to the cows, whether they were kept in old dry pasture, or in rich fall feed, or soiled; whether they had meal or not; in fact all that related to the keeping of the cows was left in profound ignorance. This ought not so to have been. The mode of feeding, we believe, has much to do in determining the quality of the product, and should be included in the statement, as well as the breed of the cow. For if one breed is better than another for butter purposes the farmer ought to know it, and make the selection; for, at the price which a really good article of butter commands, they cannot afford to keep an ordinary cow, when a good one from the same food will increase his profits from fifty to seventy-five per cent. So, too, if it is in the keeping, and not the cow, he ought to know it, that he may govern himself accordingly and so reap the legitimate results of his labor. And in these statements all this information should be given; hence the statement should include all that is necessary to be known of the entire process from beginning to end of this useful art, that others may profit by their neighbors' experience. And we hope that this course will be adopted in the future by the government of the society, so that it may not only secure a larger measure of valuable information, but may also increase its usefulness.

And then the methods of manufacture should also be more fully given, as, where is the milk kept? how is the cream preserved? what churn is used? whether the butter is washed or not? how is the butter worked—whether with any kind of worker, hand or paddle?—in fact everything relating to the entire process, and then these statements will be valuable references to all who take an interest in this important matter. We found upon an examination of the statements that scarcely any allusion was made to any of these things; but in the matter of salting there was great diversity of practice, some using one ounce per pound, others somewhat less, while one used only one-half ounce per pound; and yet we found the results nearly the same. Now, what was the kind of salt used, in what condition and how applied, is what we all want to know; for if one-half will do as well as the whole it is a fact worth knowing by the farmers. For what is wanting most of all here as elsewhere is knowledge; and what one has acquired that should he be made to communicate to others, that they may be partakers of his joys and profits.

There are other matters to which we would like to call the attention of the society and of individuals; but we must leave them unsaid, trusting that the future may disclose all that need be said on this most delicious subject.

S. Barber, *Chairman.*

MIDDLESEX.

Statement of Mrs. John S. Keyes.

The twelve pounds of butter done up in pats for the table and stamped with a pine-apple mould, was churned to-day. The cows are Jersey, and have had, since last May, only common pasturage, on a sandy hillside, with an occasional feed at night of green cornstalks, but no meal, shorts or grain of any kind whatever. The milk is set in tin pans, into which it is strained directly from the tin milk-pail, in the milk cellar. This is in the north-west corner of the house cellar, with stone and brick walls, and measures about ten feet in length by seven feet in width and height. It has but one small window, a foot square, facing west, and an opening in the door opposite for ventilation, covered with wire gauze, and closed in cold weather. The temperature of the cellar is never changed by artificial means, and varies with the weather, probably averaging from 60° to 75°. The cream is skimmed in the morning from the milk set forty-eight and thirty-six hours previously, (in very warm weather standing thirty-six and twenty-four hours only,) and is kept, after skimming, in a stone jar in the milk cellar till churned. It is stirred gently but thoroughly each morning, when the new cream is poured in and no salt is ever added. The churning is done weekly in a thermometer churn of Nourse & Co.'s pattern. This is brought as near to 62°, by ice or water in the outer compartment, as practicable. The time occupied in churning varies from five to thirty minutes in summer, and from thirty to ninety minutes in winter. This churning took just half an hour, and was harder to churn than usual. The buttermilk is drawn off and the butter worked by hand and a wooden butter spat, till the buttermilk is all out. No water is ever used or allowed to come in contact with the butter at any stage. Salt is then added in the proportion of about three-fourths of an ounce to the pound, which best suits the taste of those who eat it, and it is thoroughly worked in by hand. The butter is then allowed to stand for some hours, frequently till the next day, when it is again worked over as before, as long as any moisture can be found on the tray. It is then stamped for use, and kept in a jar in the milk cellar, frequently for weeks or months without any change, owing to the thoroughness of the working out the buttermilk.

NORFOLK.

Statement of A. W. Cheever.

This lot of butter is part of one week's churning. The milk is strained about two inches deep, into tin pans, and set in a room on the ground floor. This room is furnished with movable racks for the milk to rest on, and is used for nothing but milk and cream. The cream is usually taken off every morning and kept in a large tin pail that will hold about five gallons. It has a close-fitting cover, and is hung in the well to cool the cream, whenever it is desirable. The well is under a roof, and is furnished with pulleys, so that forty or fifty pounds of cream or butter may be lowered or raised with ease, and remain at any depth desired. The cream is well stirred when more is added, and is churned but once a week, except in extreme warm weather.

Churning is always done with the cream at a *known* temperature, varying from 60° to 64°, according to the outside temperature. Churn about an hour in Davis' self-adjusting churn. When the butter begins to "gather," pour in a few quarts of cool milk or water to thin the buttermilk and aid its running off. When it is drawn off, put in more cold water to cool and harden the butter and clear off the remaining buttermilk. If the cream contains little flakes of sour milk that have, by heat or age, become separated from the whey and formed cheese, and known as "white specks in butter," I know of no way of getting them off from the butter as easily as to thoroughly rinse in cold water several times. It must be done before the butter is gathered into a solid mass. If the sour milk contained in cream is thin and tender, as it is in its first stages of souring, it will all leave the butter readily in the buttermilk, but when it has separated from its whey and become cheese or curd, it can only be removed by picking out the specks by hand, while working, or washing off in water while the butter is in little crumbs in the churn.

After the butter has been sufficiently cooled and worked in the churn, it is taken on to a maple board, shaped like a fan, four inches wide at one end and twenty-six at the other, and twenty-eight inches long, with four-inch strips at the sides put in with screws. At the narrow end, a three-inch strip is screwed on across the sides, and forms a cap, under which a movable white-oak lever is held down at its small end. This lever is the same length of the board on which it is worked, exclusive of the handle, which is turned at the large end. The face of the lever is about two inches wide at the small, and three at the wide end.

After the worker is scalded and cooled in cold water and fastened firmly in a common sink, with the narrow end about four inches the lowest, the butter is taken from the churn with a ladle and placed under the lever, at the rate of ten pounds at a time. It is then repeatedly pressed and turned till the moisture, (it can hardly be called buttermilk,) is thoroughly removed.

Salt is then worked in with the lever, at the rate of about three-fourths of an ounce to the pound of butter, which is as much salt as my customers will allow. More would be required if it were added while the milk remained in the butter, as much of it would run off with the buttermilk, while working.

If the salt could be worked into every particle of the butter at this time, it might be now ready to stamp for market and deliver to the customers. But as salted butter is yellower than fresh, unless the salt is actually distributed perfectly even through the whole mass, it will, after standing a few hours, show, on being cut, a streaked, spotted or marbled appearance, —coarse or fine,—according as it was worked much or little after being salted.

In warm weather I prefer to hang the butter in the well to cool a few hours before putting it through the mould; again working it evenly at this time, on the worker.

This season, until July 1, my butter was sold at fifty-five cents per pound; in July at fifty cents; and the last three weeks at sixty cents, delivered to the customers.

During the four months' trial I have had eight cows. One was sold for beef June 22; one heifer, three years old, dried off July 15; one cow came in August 1. Have now six in milk. Two are in their prime; one of them, the one that came in August 1; the other four are all young. Two calved in August of last year; the other two calved at two years old or under, last spring. The two old cows gave at this time about twenty-two quarts per day; the other four only about eighteen; or forty quarts per day in all. One quart and a pint per day are sold; also all the night's milk one day in each week is skimmed at twelve hours old. Have made, in the time between May 15 and September 16, inclusive, 512 pounds, besides what has been used in the family.

The feed is now mostly corn fodder, cut up green and fed in the stall. Some dry hay is given, also three pints of corn meal per day. The cows were turned to pasture about June 1, and had two feedings of hay each day. The pasture has yielded very little feed since August 10, when the corn was ready for them. The cows have run out from six to eight hours per day. The remainder of the time they have been in the stalls, where a large amount of manure has been secured for future crops.

APPENDIX.

Inquiries in regard to the organization and course of instruction of the Massachusetts Agricultural College are so frequent that the following pages from the annual catalogue of the Institution are added, as a means of information easily accessible to the public.

MASSACHUSETTS AGRICULTURAL COLLEGE.

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JOHN GRIFFIN, Gardener.

COURSE OF STUDY AND INSTRUCTION.

FRESHMAN YEAR.—*First Term.*—Algebra; Human Anatomy and Physiology; Chemical Physics. *Second Term.*—Geometry; French; Chemistry. *Third Term.*—Geometry; French; Botany. Lectures upon Hygiene, Chemistry, Botany and Agriculture; and Exercises in Orthography, Elocution, and English Composition, during the year.

SOPHOMORE YEAR.—*First Term.*—German; Agriculture; Commercial Arithmetic and Book-keeping. *Second Term.*—German; Trigonometry; Analytical Chemistry with laboratory practice. *Third Term.*—Mensuration; Surveying; Analytical Chemistry; Zoölogy; Drawing. Lectures upon Comparative Anatomy, Diseases of Domestic Animals, Organic Chemistry, Dairy Farming and Market Gardening; and Exercises in English Composition and Declamation, during the year.

JUNIOR YEAR.—*First Term.*—Physics; French or German; Agricultural Chemistry with practice in the laboratory and the field; Drawing. *Second Term.*—Physics; Rhetoric; Horticulture. *Third Term.*—Astronomy; Systematic Botany; History of the United States. Lectures upon Physics, Mineralogy, the Cultivation of the Vine, of Fruit and Forest Trees, and Useful and Injurious Insects; and Exercises in English Composition and Debate, during the year.

SENIOR YEAR.—*First Term.*—Intellectual Philosophy; History; Physical Geography. *Second Term.*—Moral Philosophy; Political Geography; The Civil Polity of Massachusetts and the United States. *Third Term.*—Geology; Engineering; Political Economy. Lectures upon Stock Farming, Architecture, Landscape Gardening, Geology and English Literature; and Exercises in Original Declamation and Debate, during the year.

Exercises in Gymnastics, Military Tactics, and the various operations of the Farm and Garden, through the course.

DAILY ROUTINE, WINTER TERM, 1869.

At 6.30, a. m., bell for rising; at 7, a. m., bell for breakfast; at 8.45, a. m., bell for prayer; at 9, a. m., bell for study or labor; at 12, m., bell for dinner; at 1, p. m., bell for study or labor; at 5.30, p. m., bell for supper; at 7, p. m., bell for study.

Sundays change as follows: At 7, a. m., bell for rising; at 7.30, a. m., bell for breakfast; at 8.45, a. m., bell for prayer; at 10.15, a. m., bell for church; at 3.30, p. m., bell for Bible class.

EXERCISES OF SOPHOMORE CLASS.

At 9, a. m., Manual Labor on Mondays, Wednesdays and Fridays. *First Division.*—At 1, p. m., Laboratory Practice; at 3, p. m., Trigonometry; at 4, p. m., German. *Second Division*—At 1, p. m., German; at 2, p. m., Trigonometry; at 3, p. m., Laboratory Practice.

Saturdays change as follows: At 9, a. m., Declamations; at 10, a, m., Compositions or Translations; at 11, a. m., Examination in Analytical Chemistry.

EXERCISES OF FRESHMAN CLASS.

At 9, a. m., Chemistry, Recitation or Lecture; at 10, a. m., Geometry; at 11, a. m. French; at 1, p. m., Manual Labor on Mondays, Wednesdays and Fridays.

Saturdays change as follows: At 9, a. m., Reading and Spelling; at 10, a. m., English Composition; at 11, a. m., Lecture on Agriculture.

ADMISSION.

Candidates for admission to the Freshman class are examined in writing upon the following subjects: English Grammar, Geography, Arithmetic, and Algebra, to Quadratic Equations.

Candidates for higher standing are examined as above, and also in the studies gone over by the class to which they may desire admission.

No one can be admitted to the College until he is fifteen years of age; and every student is required to furnish a certificate of good character from his late pastor or teacher, and to give a satisfactory bond for the prompt payment of term bills. Tuition and room-rent must be paid in advance, at the beginning of each term; and bills for board, fuel and washing, at the end of every term.

The regular examination for admission is held at the Botanic Museum, at 9 o'clock, A. M., on the second Thursday of September; but candidates may be examined and admitted at any other time in the year.

Further information may be obtained from President W. S. Clark, Amherst, Mass.

Calendar.

The next academic year begins September 9th, 1869, and is divided into three terms. The first term begins the second Thursday of September, and continues thirteen weeks. The second term begins the fourth Thursday of January, and continues thirteen weeks. The third term begins the first Thursday of May, and continues thirteen weeks.

Expenses.

Tuition, $12 per term; room rent, $5 per term; incidental expenses, $1 per term; board, $3.50 per week; washing, 50 cents per dozen; expenses of Chemical Laboratory, to students of practical chemistry, $5 per term; public and private damages, including chemical apparatus, at cost.

Remarks.

The full course of study occupies four years, and those who complete it will receive the degree of Bachelor of Science. Three recitations, or their equivalent in lectures or literary exercises, are assigned for each day, except Saturday and Sunday. Saturday afternoon is devoted to scientific excursions and recreation. On Sunday all are required to attend church, or Bible class; but in all biblical instruction the inculcation of denominational views is, as far as practicable, to be avoided.

All students are expected to engage in manual labor six hours per week when required, without compensation, for the purpose of learning the various operations of the farm and garden, and those who wish to perform additional work for wages will be allowed to do so and receive pay at the rate of ten cents per hour.

Students wishing to be absent from any assigned duty are expected to ask permission beforehand, whenever that is practicable, and in all cases to present their excuses after an absence to any officer from whose exercise they may have been absent.

A careful record will be kept of the attendance, attainments and deportment of every student, and sent to his parent or guardian at the close of each term, and only such as are faithful, successful and gentlemanly will be allowed to continue members of the College.

Those who pursue a select course will attend recitations and lectures with the regular classes; but persons properly qualified and desiring special instruction in Chemistry, Civil Engineering, Agriculture or Horticulture, will be allowed to make private arrangements with the officers having charge of those departments. During the present collegiate year instruction will be given only to the Freshman and Sophomore classes.

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